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POLLUTION OF LAKE ERIE AND ITS TRIBUTARIES. PROCEEDINGS OF CONFERENCE HELD AT CLEVELAND, OHIO ON AUGUST 3-6, 1965. VOLUME 3

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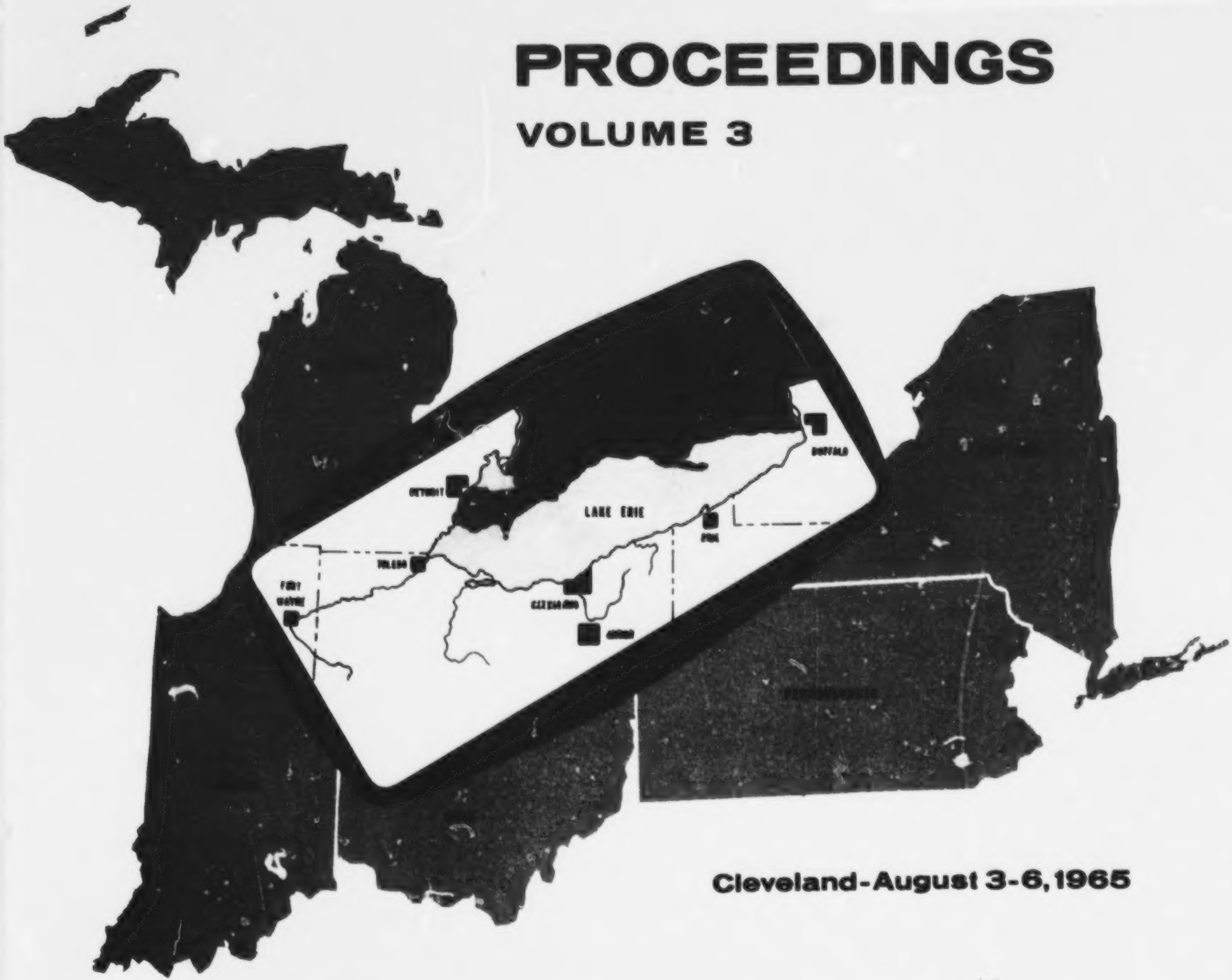
DETROIT
LAKE ERIE
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Cleveland-August 3-6, 1965

Conference

In the matter of Pollution of Lake Erie and its Tributaries

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STATEMENT OF
DR. EMMETT W. ARNOLD,
CONFEREE AND DIRECTOR OF THE
OHIO DEPARTMENT OF HEALTH

DR. ARNOLD: Mr. Chairman, Conferees, Participants, Ladies and Gentlemen:

My name is Dr. Emmett W. Arnold. I am Director of the Ohio Department of Health and Chairman of the Ohio Water Pollution Control Board. I am appearing before this conference in the matter of Pollution of Lake Erie in behalf of the Ohio Department of Health and the Water Pollution Control Board.

We are presenting a detailed report about the current status of water pollution control programs of municipalities and industries in that part of Ohio which is located in the Lake Erie watershed, roughly about one-third of the State. This includes the municipalities and industries along the lakeshore and also those on tributary streams.

The report is specific and includes a large amount of tabular material. With consideration for the time it would take, we have chosen not to

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read this report. We are presenting it for the record of the Conference. We also have brought along several hundred copies of the report for Conferees, Participants and others who are interested.

We should like to take just a few minutes for some very brief comments on the report.

Ohio's efforts to combat water pollution were intensified by the passage of a new state water pollution control law in 1951 which became fully effective September 27, 1952.

During the 13 years since then, we believe that impressive progress in pollution control has been made by both municipalities and industries under pressure from the Water Pollution Control Board which was created by the 1951 law. Board pressure is exerted primarily through the mechanism of conditions issued with waste discharge permits. Board pressure can be tightened by formal hearings and orders for permittees not meeting the permit requirements. Finally the Board may turn cases over to the Attorney General of Ohio for prosecution.

By far the majority of municipalities and industries of Ohio have met the time schedules for improvements set by the Board in its permits. And I might comment at this point that the biggest problem of such a Board is the establishment of time schedules which are realistic, taking into consideration engineering time, construction time, financing time, and related economic factors, as opposed to the great desire of everybody concerned to end pollution as quickly as possible.

As examples of the progress made in pollution control by the pollution control law in Ohio, I might refer to some of the sections of the report which we are presenting. The Maumee Watershed is the largest in Ohio discharging into Lake Erie. In 1951, only three per cent of the Maumee Basin sewered population had satisfactory sewage treatment facilities. In 1951, there were 54 industries discharging wastes into the Maumee, only five of which had acceptable waste treatment. Today, 50 industries discharge wastes into the stream, 41 of which have provided approved waste treatment measures.

In 1951, a large number of sizable municipalities on the lakeshore in Ohio had no sewage treatment plants at all and were discharging raw, untreated sewage directly into the lake. Among these were Conneaut, Ashtabula, Painesville, Eastlake, Willoughby, Fairport Harbor, Avon, Lorain, Sandusky and Port Clinton. Today all of these municipalities have sewage treatment plants. Furthermore, other cities along the lakefront have enlarged their sewage treatment plants or replaced them with new and better facilities, including Toledo, Cleveland, Rocky River, Lakewood and Euclid.

Questions have been raised about the degree of sewage treatment. Of the approximate 3 million Ohioans served by public sewerage systems in the Lake Erie drainage basin, 75 per cent now are served by secondary treatment facilities - and 79 per cent will be served by secondary treatment when current construction is completed.

In the Cuyahoga River Basin 99.8 per cent of the population will be served by secondary sewage treatment facilities when plants and improvements now under construction are completed.

The majority of secondary treatment facilities are of the activated sludge type which are claimed to be most efficient in removal of the nutrient, phosphorous, which has become of concern because it is believed responsible for the fertilization and increased growth of algae in the lake.

Municipal problems today are involved more with sewer collecting systems than treatment facilities. Combined storm and sanitary sewers which overload easily

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and by-pass wastes directly to the lake or its tributaries are a major problem in several of the larger cities, including Cleveland, Akron, Toledo, Defiance, Lakewood, Avon Lake and Lorain. The Ohio Water Pollution Control Board is calling for correction of these inadequate sewer arrangements.

Another problem is the inadequate sewering or total lack of sewers in some of the sprawling suburban areas. These inadequacies also are in process of correction, but population expansion creates new problems of this type almost continually and it is necessary to keep issuing new orders for sewage facilities in such areas almost constantly.

Among industries in Ohio in the Lake Erie Basin are 56 which have organic wastes that are somewhat similar to municipal wastes. All but two of these now have control facilities. The remaining two are awaiting connection to municipal sewage plants. The treatment and control facilities of these plants are currently reducing the organic load by approximately 89 per cent.

Inorganic wastes of industries in the basin are many and varied, making it difficult to group them in any way for a brief comment. They are described in detail in the technical report which we are submitting. The majority of these industries have provided approved waste treatment measures, and virtually all of them have provided some correction to minimize pollution. Some individual industries, particularly in the steel and chemical categories, already have spent millions of dollars on pollution control. Our Ohio Water Pollution Control Board has obtained commitments from most of the larger industries on completion schedules for waste treatment facilities that still are needed. We have included in our report the statements made to our Board recently by major steel companies on their pollution abatement programs.

Before closing these comments, now I should like to raise a few questions that are concerning us in Ohio.

One of these questions involves the nutrients that are said to be responsible for algae in the lake. We are hoping that the United States Public Health Service will be able to provide us through its surveys with more specific information on this matter. Just what is the quantity of these nutrients in the lake? Where are they coming from?

We have in Ohio a published report of a

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Maumee River survey made in 1899, which describes algae as a major problem, and an excess of nitrogen in the water as a probable cause for the algae. Reflecting that the municipalities of the Maumee Basin were much smaller 66 years ago and industrial wastes virtually non-existent, we are led to wonder whether run-off from farm land might not be a much larger factor in this problem. We invite the Public Health Service to assist us in developing a better measuring device for this problem.

The Public Health Service has facilities and has suggested attacking this nutrient problem by requiring secondary sewage treatment by all municipalities. Since we in Ohio shortly will have secondary treatment for 79 per cent of our sewered population in the Lake Erie Basin, it would not be too much of a problem to require this for the remaining 21 per cent. Is it possible for the technicians to promise us that this will end the algae problem? In the past it has been our policy not to require more treatment than is necessary to achieve desired results. If something else is causing the algae problem we should like to know what it is.

We should like to know how much of the nitrogen used by algae comes from the air.

Can the Public Health Service through its vast research facilities develop some proposals to prevent algae growth in the lake or to remove the growth that is there now? Is there any possibility of international cooperation to destroy the algae? We believe the Federal overnment is in a better position to do something about this than the states are.

On the subject of drinking water from Lake Erie, some 2-1/2 million Ohioans obtain their domestic water from Lake Erie municipal intakes. The Ohio Department of Health has not found that these sources of supply have been endangered. Pollution control steps taken in recent years have even served to provide better protection for them. Do Public Health Service findings disagree with this?

Lake Erie is featured by some of this country's finest beaches. With the exception of a few beaches in the Cleveland metropolitan area, reports to us indicate that these beaches are entirely safe from the sanitary viewpoint. It is our belief that local area cleanup will restore the beaches that now are damaged--that Cleveland, for example, can improve the bacterial quality at its own beaches sufficiently for human safety and that the present condition of Cleveland beaches is not attributable to other communities or other states. We are anxious to know if the Public Health Service final survey report will agree with this.

Because the waters of Lake Erie are interstate and international, we look to the Federal agency involved in this conference to apportion responsibility for pollution in this connection. We should like some specific information with regard to water impairment at statelines and at international boundaries. We should like to know what kind of interstate and international programs are being recommended. We know what to do about our internal and lakeshore problems in Ohio and are doing it. We need help on the larger problems of pollution that reach beyond our jurisdiction, and hope that the Federal Government will focus its attention on these larger problems rather than duplicate the areas that are already covered.

It is our hope that this Conference on Lake Erie can have some valuable results. Frankly we would like some answers. When we get them, we shall do everything in our power to provide further improvements for Lake Erie.

(Applause.)

MR. STEIN: Thank you, Dr. Arnold. You have presented a very interesting paper, and raised some interesting questions.

I have one question to ask. If your questions are pertinent and this is true, why in the world did your Governor ask us in?

DR. ARNOLD: I think you will find that in my questions that I asked.

MR. STEIN: If you wanted a generalized integral active study, you didn't need an enforcement conference. There are other avenues to go through for a long range operation.

Are there any other questions or comments?

MR. POSTON: I have a question.

On Page 2, I think it is, you indicate that you have adequate sewage treatment in the Maumee Basin, and I wondered, is this considered as secondary treatment, your adequate treatment? You call it "adequate sewage treatment in the Maumee Basin." Is this secondary treatment?

I know that in Toledo, for example, which is in the Maumee Basin, you do have activated sludge, but I wondered whether by the word "adequate," you meant secondary.

DR. ARNOLD: Mr. Poston, I think when Mr. Eagle will continue with the Ohio report, and discusses more in detail the technical aspects of this, that question will be properly answered for you.

MR. POSTON: There were quite a few questions in your statement, and I think there are probably too many to answer here.

I think probably quite a number of them were answered in the presentation of our report.

I did wonder, however, do you feel that the nutrients that are added by Cleveland or the wastes that come out of the Cuyahoga River, as we viewed them on Monday of this week, contribute to the eutrophication or degradation of Lake Erie?

DR. ARNOLD: Yes, I do.

MR. POSTON: Then this would be a part of the eutrophication or --

DR. ARNOLD: It certainly would contribute to it.

MR. POSTON: This is a part of the total problem then, and we do have an interstate pollution problem resulting from waters of the Cuyahoga River in Ohio?

DR. ARNOLD: I think we agree to that.

MR. POSTON: I have a further question.

It is indicated that you could provide secondary treatment for municipalities within the Lake Erie Basin.

Do you have any estimate of how much time this might require if, for example, the conferees would agree that this should be done and should be a requirement?

DR. ARNOLD: I cannot make any statement about the time that this schedule could be met. I think this would depend on the financing the municipalities might be able to raise for themselves, and while we have indicated 21 per cent, I cannot speak as to exactly which ones they would be.

MR. POSTON: I don't think I have any further particular questions. I think it would be repetitious for me to try to answer all of these specific questions at this particular time.

DR. ARNOLD: I realize, sir, that some of the questions that I have posed have been discussed previously.

Now, whether you have answered the questions, I am not sure yet. I think this would require some further deliberation as to whether you can assure us what the Lake quality will be in this basin if all these plants have secondary treatment.

Can you give us a schedule of improvement? Will it be five years to accomplish this? These are things that we don't know, and if we require secondary treatment and expansion, some of these sewage treatment plants are only recently finished, and if we require it again, that these municipalities spend 5 or 10 million dollars to accomplish this, we should be able to give them some assurance that they are providing for a really better water quality in the Lake.

Do you agree to that?

MR. POSTON: Well, I think that is right.

I think, however, there is something to match this. We have heard no one here but who wants better water in Lake Erie, and I think that starting with Governor Rhodes, they want action.

Whether or not we have the total answer, I don't know that we will be able to give this, but I do think there are certain things that we know can be done and should be done, and are being done in other places.

For my part, I think secondary treatment is one of these, and, from my viewpoint, I feel that this is one of the conclusions that the conferees must come up with.

That is my comment at this time.

MR. STEIN: Are there any further questions or comments?

(No response.)

MR. STEIN: If not, Dr. Arnold, will you go on?

DR. ARNOLD: Mr. Stein, if there are no further questions of me, we would like to proceed and call on Mr. George Eagle, the Chief Engineer of the Ohio Department of Health, who will present the technical report.

STATEMENT OF
GEORGE H. EAGLE,
CONFEREE, AND CHIEF ENGINEER
THE OHIO DEPARTMENT OF HEALTH
DIVISION OF ENGINEERING

MR. EAGLE: Mr. Chairman, Gentlemen:

With the passage of the Ohio Water Pollution Control Act in 1951, the State was given authority for the control of waste discharges. The law provides the means for the devedopment of programs for industrial wastes and sewage treatment on an individual and on an area wide basis. Previous acceptance of polluted conditions over many decades, such as those found in some stretches of the Cuyahoga River, has resulted in an apathy that is not easily overcome. Resistance of the public to increased taxes and to increased costs of consumer items has contributed to this apathy.

In establishing these programs, water quality criteria has been developed for various water uses. In turn, waste treatment requirements have been established to maintain the desired water quality. To implement these programs, the Ohio Water Pollution Control Act of 1951 provided the mechanism for requiring the corrective measures necessary to obtain the desired condition by the issuance of permits to discharge sewage, industrial wastes, or other wastes into "waters of the state". Permits are issued for relatively short periods of time. Renewal is contingent upon compliance with specific requirements.

This report tells what has been done, the problems which remain as the State of Ohio sees them, and what is being done to resolve them. When an aroused and informed public has indicated its willingness to assume the financial costs of the projects involved, the day will be hastened when desired water quality objectives are attained. This report is a factual summary. It is a tribute to the municipalities, industries, conservationists, civic groups and others who have expended time and money to develop acceptable water quality in Lake Erie and its tributaries.

LAKE ERIE WATER QUALITY

Water Quality Data

Data collected by or made available to the Ohio Department of Health on water quality with respect to public water supplies and bathing beaches has been available to the U. S. Public Health Service.

Public Water Supplies

Analysis of water intake data at the public water supplies on Lake Erie has shown water to be acceptable from chemical, physical, and bacteriological standards are recommended by U. S. Public Health Service. At two water intakes (Avon Lake and Painesville) which are relatively close to shore the data shows the effect of local pollution, at times. These occurences are limited to periods of abnormal weather conditions, e.g., wind director or heavy rainfall. Despite these influences the intakes at no time indicated a quality which was not well within acceptable standards of water supply. At no time has the finished water been found unsafe for consumption.

Bathing Beaches

Analysis of bathing beach waters is the responsibility of the local health unit. However, the State of Ohio has made surveys of bathing beaches in conjunction with the local authorities. Of the 28 beaches in Ohio, some have been found to be consistently up to recommended standards, some periodically substandard and some consistently below standard. The surveys have shown that the beaches which do not meet recommended levels of bacterial quality are affected by storm, sanitary or combined sewer discharges in their immediate vicinity. Several of the larger beaches -- Cedar Point, East Harbor and Crane Creek have water of excellent quality for swimming. The Cleveland beaches are influenced by the sewer discharges.

Tributary Streams

The data collected from the monitoring program of the rivers by the U. S. Geological Survey under its cooperation program with the State of Ohio show the poorer quality conditions which are receiving the attention of the Ohio Water Pollution Control Board in its abatement program. These are specific quality problems that can be attributed to specific discharges. The data have shown degrees of improvement where the abatement program progress has exceeded growth and new sources of discharge. The majority of the sewage treatment plants are now in or nearing completion. The industrial waste programs are well underway and the Board is now establishing final completion dates for specific companies. The goal year of 1969 should see most work completed. New industrial establishments have adequate waste treatment facilities installed at time of start of operation.

Debris

The obvious pollution of debris, oil and scum which accumulate in harbors and along the shore is receiving attention from the state agencies, local governments, and civic organizations. Debris washed down by storms, whether from land or rubbish piled along banks, required constant policing. The cities in Ohio have not provided for such cleanup as they do for streets but the public is now recognizing their responsibility.

George H. Eagle

MAUMEE RIVER BASIN

Georgraphy

The Maumee River Basin covers 6,586 square miles of which 4,856 lies within northwestern Ohio. The major streams of the basin consist of the St. Joseph River rising in Michigan and the St. Marys River which rises in Shelby County, Ohio and flows northwesterly towards Fort Wayne, Indiana. There it joins the St. Joseph River to form the Maumee River, which flows northeasterly through Defiance to Lake Erie. At Defiance, the Tiffin River from Michigan and the Auglaize River which drains the southeastern portion of the basin join the Maumee River. Major tributaries to the Auglaize are the Blanchard and Ottawa Rivers.

The area of the basin is roughly circular in shape, having a diameter of about 100 miles and resembles a huge saucer in that it is steep at its extremes and flat in the middle. This topography, along with permeable soil, lower rainfall and limited underground storage results in low stream flows in this area. In general, yields per square mile are the lowest of any basin in Ohio.

George H. Eagle

Population

As of 1960, approximately 877,000 persons resided in the Ohio portion of the Maumee basin and the Ten Mile Creek area. Approximately 70% of the population (617,900 persons) live in cities and villages. Of this number slightly more than 50% reside within the city limits of Toledo.

Population growth for the basin as a whole has been considerably less than that for the state. However, since 1950, the rate of growth of Lucas County has exceeded that of the state. The high rate of growth of Lucas County is expected to continue and in time it is expected that this growth rate will extend to other areas of the basin.

Economy

Approximately 90% of the area is in agricultural use on 22,700 farms. Crops include corn, wheat, soy beans, sugar beets, and tomatoes as well as hogs, dairy cattle, and poultry. In 1954, the gross farm income from this area was estimated to be $354,000,000 or 23% of the total farm income for the state. Recent trends towards high-income crops for the expanding canning industry in the basin has stimulated the use of stream waters for supplemental irrigation. Lack of water during the growing season has limited growth.

Nearly 117,000 persons are employed in some 1,500 manufacturing plants. The principal industries are automotive, glass, metal fabrication, petroleum, chemical, paper, rubber and, of course, food and beverages. All these manufacturing plants, as well as several electric power generating stations, rely heavily on an adequate supply of good quality water. Many of these establishments, as well as farming practices, contribute to the water quality problems of the basin.

Water Uses

It is estimated that approximately one billion gallons per day of water is used by the citizens and industries of the basin. Of the daily use, 65% is for electric power production. Nearly 20% of the daily use is for manufacturing and 10% for municipal uses.

Of the water used for municipal water supplies, nearly 70% is obtained from Lake Erie, 21% from inland surface supplies (such as the Maumee, Ottawa and Blanchard Rivers), and 9% is obtained from underground sources. There are 62 communities in the basin served with public water supplies.

Approximately 90% of the water used for power production and by manufacturing companies with separate supplies, is obtained directly from Lake Erie or the lower Maumee River, which is augmented by back waters from Lake Erie. Inland, the major portion of the water used for manufacturing is obtained from wells. One major food processing industry obtains its water supply from the Maumee River.

Due to limited size, fluctuation in flow, soil erosion, and waste discharges, many of the streams are not suitable for good fishing. Only a limited portion of the streams are readily accessible to the public due to Ohio law with respect to rights of adjacent property owners. In spite of the limitations, however, a few streams provide good fishing -- sections of the Maumee River near Defiance, the Blanchard River above Findlay, the Auglaize River, little Ottawa River, Riley Creek and the main stem of the St. Joseph River.

None of the state properties operated for recreation have state park status at present. However, a number of areas involving water based recreation is being planned. Boating and water skiing is carried out in a few of the stretches of the Maumee River. Due to low flow, irregular depths and other physical limitations, there are very few stream stretches suitable for swimming.

Municipal Sewage Treatment

In 1950-51, the Division of Engineering, Ohio Department of Health, conducted an intensive survey of water pollution of the Maumee River. The findings of that survey revealed that only 14 communities with 471,000 persons had sewage treatment facilities. However, only 6 of these facilities, serving a population of only 22,760 persons, were considered as currently acceptable at that time. In other words, 3% of the basin population was served by adequate sewage treatment plants, and by "adequate", Mr. Poston, I mean currently acceptable to the Ohio Department of Health at this time. In contrast, there are now 33 communities having sewage treatment facilities for 521,000 persons residing in 37 communities. The facilities of one city - Sylvania, population 5,187; and one village - Columbus Grove, of 2,100 persons are considered as currently inadequate. Thus, nearly 97% of the basin's population living in communities with public water supplies are served by adequate sewage treatment facilities. Details of the sewage treatment facilities provided by each municipality is given in Table 1A.

By referring to this Table it will be noted that 10 of the 12 cities and 18 of the 21 villages provide secondary treatment. Treatment facilities other than those capable of secondary treatment have been permitted in those areas where stream dilution in relation to waste loads and downstream water uses are such that a higher degree of treatment is not considered necessary, or was not considered necessary at the time this report was printed.

No treatment facilities are provided by 17 villages having a combined population of 15,903 persons. (See Table 1A)

Municipal Sewage Collection

Of the twelve cities in the basin that provide sewage treatment services, two have separate sewage collection systems, 7 have both separate and combined systems, and 2 small cities have only combined systems. Better control of sewage overflows from combined sewers is required in Defiance and Toledo. Extension of sanitary sewers is required in the areas of Lima, Defiance and Toledo.

George H. Eagle

Industrial Wastes

Of the 54 industries studied during our 1950-51 survey, only 5 were considered as providing adequate industrial waste treatment facilities. At present, there are 50 industries which discharge their wastes directly to the streams of this basin, of 50 industries which discharge their wastes directly to the streams of this basin, of which 41 have currently acceptable treatment facilities. One of the new industries with inadequate facilities has improvements under construction; two require further in-plant controls; 4 need improvements; and, 1 has the problem under study. Details of the waste treatment facilities provided by each of the industries in this basin is given in Table 1B.

Now, the remaining problems as we see them:

The most widespread problem in the Maumee basin is low dissolved oxygen which occurs in many stream stretches. This has occurred in spite of the fact that well operated secondary sewage treatment plants, removing in some instances 90 to 95% of the tributary B.O.D. loads, have been provided. The extremely low flow in many of the receiving streams, ranging from 0.15 59 .33 cfs per 1000 P.E. of tributary load is a significant factor. Other factors are stagnant pool areas, some of which receive significant discharges of heated water, oils, ammonia, and other forms of nitrogen, and algae. Just what treatment devices should be provided in some of these areas is of real concern to the Ohio Department of Health.

Algae not only contributes to the low D.O. problem, but it is thought to be one of the factors which gives rise to the taste and odor problems in drinking water obtained from the Maumee River. Other related factors are agricultural drainage, ammonia, and persistent organics, such as used in pesticides. Nutrients, such as nitrates and phosphates, contribute significantly to the growth of algae.

Tastes and odors, algae and low D.O. problems are not new to this basin. In a survey for public water supplies in 1899, by the Ohio State Board of Health, all three of the above conditions were found in the stream waters around Findlay, Lima, Defiance, Napoleon, and Toledo. Nitrates were particularly high after the first late summer rainfall indicating that agricultural runoff contributes to this condition.

High coliforms in stream stretches below some of the cities in this basin remain a significant problem. Better sewage collection and disinfection will be required to improve those areas suitable for water based recreation.

The extremely large quantities of sediment carried by the Maumee River as the result of soil erosion is a very serious problem. Aggressive State and Federal programs in soil conservation are badly needed in this basin. In addition, further efforts are needed to minimize the loss of rich soils by excessive floods.

George H. Eagle

CUYAHOGA RIVER BASIN

Geography

The Cuyahoga River drains a 813 square mile area located in the northeastern part of Ohio. It is the second largest stream flowing into Lake Erie from Ohio. From its headwaters, which are nearly 16 miles south of Lake Erie, the river flows south towards and through the City of Akron. From there it turns sharply and flows in a northwesterly direction through Cleveland into Lake Erie. The upper reaches of the river is a shallow channel cut through glacial drift with a fall of about 9 feet per mile. At Cuyahoga Falls, where the river cuts through sandstone, the fall is 220 feet in 1.5 miles. In the lower northward course, the river flow is a wide pre-glacial valley with a fall of 6 feet per mile. The last six miles of the river is essentially an estuary which is significantly affected by lake levels.

Population

The population of the Cuyahoga River basin is estimated to be approximately 1,328,000 persons of which nearly 800,000 live in the metropolitan areas of Akron and Cleveland. The rate of growth of these areas has far exceeded that of the state as a whole. It is estimated by the year 2000 that more than 2,000,000 persons will live in the basin.

Industry

Cleveland is a major center for the production of primary metals and fabricated metal parts. Akron is known as a major rubber center. Other important industries include chemical, electrical equipment and oil refinery. In 1953 it was estimated that value added to all manufactured products was 2.1 billion dollars. Many of the industries depend on large quantities of water for cooling and processing.

Approximately 16,000 persons are employed in steel production, 125,000 in metal fabrication, 60,000 in the production of rubber goods and 5,500 persons are employed by the chemical industries.

Water Use

Seven communities obtain their water supply from surface or underground supplies within the basin. Akron and Ravenna, which obtain their water from surface supplies, consume nearly 42.0 mgd. The five other communities which obtain their water from wells consume about 4.0 mgd. Cleveland and its suburbs obtain their water supply from Lake Erie.

It has been estimated that the average daily use of water in the basin by manufacturing plants with separate supplies is nearly 530 mgd of which all but about 10 mgd is obtained from surface supplies. Approximately 65 mgd is obtained from lakes in the Akron area and the remainder is obtained from the lower river. In addition to the above, approximately 730 mgd of surface water is used for cooling water in the production of electric power. Since the average annual flow of the Cuyahoga River is approximately 500 mgd at Independence, it can readily be seen that the river water is reused several times during periods of low flow. It should be realized, however, that some of this water is made up of backwater from Lake Erie.

Municipal Sewage Treatment

There are 19 cities in the basin which discharge their sewage to the streams of this basin. Nine of these provide their own sewage treatment facilities whereas seven are tributary to the facilities of Cleveland, and two cities are tributary to the facilities of Akron.

One of the cities tributary to Cleveland provides treatment for a part of its sewage. One small city in the Cleveland area provides no treatment of its sewage.

Of the 14 villages in the basin, three are tributary to the facilities of Akron, four are tributary to the facilities of Cleveland, six provide their own sewage treatment facilities. Only one currently has no organized sewage treatment facilities. Details of these treatment facilities and the programs underway are summarized in Table 2A. As noted in the table, five of the facilities provided by the nine cities with sewage treatment plants and the one with no facilities are considered as currently inadequate. The others are adequate.

Municipal Sewage Collection

Separate sanitary sewage collection systems have been provided by all but two cities and one small village. The cities with significant combined storm and sanitary sewer systems are Cleveland and Akron. In both of these municipalities significant quantities of sewage overflow to adjacent streams even during relatively light rain falls. The Ohio Water Pollution Control Board has directed these cities to improve the maintenance of their systems, and to obtain data on occurrences of overflows for the preparation of plans for suitable corrective measures.

Plans for a major interceptor to make the rapidly growing area north of Akron tributary to enlarged facilities of the city of Akron have been completed and should be placed under construction soon.

Likewise, additional sewage collection facilities are needed in the Cleveland low level area. Although major intercepting sewers have been planned in this area for many years, the construction of these sewers has progressed very slowly. Such sewers would collect sanitary sewage and some industrial wastes which are now discharged untreated to the lower Cuyahoga River.

Industrial Wastes

The industrial complex on the Cuyahoga River will be considered in terms of types of industries. Each company operates under an Ohio Water Pollution Control Board permit requiring continuing improvement until adequate treatment is provided.

Steel Plants

There are three major steel plants on the Cuyahoga River. Located in the navigation section of the river these companies use the river for navigation, water supply and ultimate disposal of wastewaters. The plants have been located in Cleveland for many years. A major problem has been the separation and collection of sewage for connection to the municipal sewers. The steel companies have been undergoing large scale modernization and in such construction adequate waste treatment facilities are being provided. The revamping of waste control operations in the older parts of the plants present more difficult problems.

Following the Ohio Water Pollution Control Board policy of periodically reviewing progress of the programs in river basins, the Board invited the three steel companies to present a summary of accomplishment and plans with expected completion date for the remaining waste controls required. The steel companies met with the Board on June 8, 1965. Their reports are given in Appendix A of this report.

It should be noted in these reports that the steel companies have made definite commitments to complete their pollution abatement programs. These schedules are being included in their future Board permit requirements.

Chemical Plants

The chemical plants are scheduled to meet with the Water Pollution Control Board on September 14, 1965, to report progress and provide schedules for completion of programs as the steel companies did in June.

The chemical industry provides wastewaters containing a great variety of compounds -- some which have been produced over a century and others of recent development. The wastes must be classified according to their effects: some cause taste and odors in water supplies; some are toxic if the concentration is high enough; some change the physical characteristics of the stream - this may be color, deposit of solids, or acid or strongly alkaline water.

The State of Ohio has not attempted to develop a limit on each compound which may be in a chemical plant discharge but has established water quality objectives related to water usage and a discharge interfering with that usage is designated as inadequately treated. The effects of the wastewater discharges are thus the important control. This is not the easy way to administer the program but it is the effective way. The company thus has the responsibility for determining which substance or compound is responsible for interfering with the desired quality.

This approach has caused the companies to carefully appraise their operations in an effort to reduce or eliminate losses. Changes in process have been effective in many instances. In other instances, it has been found effective to treat wastes at individual sources rather than attempt a treatment of all wastewaters at the same time.

The chemical industry plants have provided separation and collection of sewage and connection to public sewers. In some instances, the change in process or pretreatment of the industrial waste waters has permitted discharge of the industrial waters to the public sewer and eliminate a discharge to the river. These are E. I. duPont deNemours and Company, Harshaw Chemical Company, Sherwin Williams Company, Reilly Tar and Chemical Company, and General Chemical Division of Allied Chemical Corporation.

The duPont Company has produced industrial chemicals at the same site in Cleveland since 1867. The principal products are acids and zinc and ammonium salts. The company has spent over $300,000 in the past 10 years to reduce the losses of these products from their production processes. The result is that the loss of zinc salts is one-half what it was in 1954 and ammonium salts lost are only one-fifth as much. In addition, a new

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sanitary sewer system separated sewage from industrial process water. The sewage is now discharged to the city of Cleveland sewers. A neutralizing plant has been constructed to treat the acids in the miscellaneous process waters before they are allowed to return to the river with the cooling water.

The Harshaw Chemical Company produces many compounds for use in the chemical industries. Major production is in metallic salt and solutions of nickel, copper, zinc, and cobolt. The principal characteristics of these wastes are the metallic ions and calcium sulphate. The approach of the company had been to install control measures in each process operation to prevent losses. Rearrangement of sewers with the installation of sumps with flow measuring and sampling devices has permitted very close surveillance and control. Appreciable reductions have been made in the loss of metallic ions. Calcium sulphate is slightly soluble so some is lost in the discharge to the river. Generally the concentration of these materials in the river are not sufficient to cause any problem. This company has segregated its sanitary sewage for discharge to the Cleveland sewerage system at a cost of $50,000.

The Sherwin Williams Company has two plants on the Cuyahoga River which originally discharged sanitary and industrial wastes into the river. These are the Paint and Varnish Plant and the Linseed Oil Plant. At the Paint and Varnish Plant the industrial wastes and sanitary sewage have been segregated, pretreatment facilities provided for the industrial wastes and both sewage and industrial wastes are now discharged to Cleveland intercepter sewers. At the Linseed Oil Plant industrial wastes consist principally of sludges from the refining processes. The sanitary sewage, cooling waters, and industrial wastes have been segregated and the sanitary sewage will be discharged to the Cleveland intercepter when available. The company in cooperation with the City of Cleveland investigated the possibility of hauling the sludges to the Westerly Treatment Plant for treatment in the digesters. This did not prove feasible. Plans are in preparation for treatment and filtration of the sludges by the company with disposal of sludge cake at municipal sanitary fills. The filtrate probably will be discharged to the Cleveland sewers.

The Reilly Tar and Chemical Company, a tar refining operation, originally discharged sanitary sewage and industrial wastes (oils and phenolic compounds) to the Cuyahoga River. This company has since installed pretreatment facilities (oil recovery) and now discharge all wastes to the Cleveland sewers for treatment by the city.

The General Chemical Division's (of Allied Chemical Corporation) principal product is sulphuric acid. Normally cooling water is the only discharge from this operation. The water can entrain some contamination from the process. By careful in-plant controls and analysis the company maintains a satisfactory effluent. Sanitary sewage has been segregated and is now discharged to a county sanitary sewer at a cost of $30,000.

Oil Refineries

The oil refinery story parallels other industrial programs in that there was a collection of sewage from sanitary facilities for discharge to the city sewers and a series of controls instituted to prevent loss of oils to the river. The program of the only refining company in the Cleveland - Cuyahoga Basin area - the Standard Oil Company - has been extensive. Plant No. 1 is moving from the Cleveland area so most of the following summary of accomplishments will be limited to Plant No. 2.

1. Constructed culverts in Kingsbury Run to improve refinery sewer system ($250,000), provided diversion tunnel for Kingsbury Run ($320,000) and provided other sewers for separation of sewage and collection of in-

dustrial waters ($55,000).

2. A new separator with air flotation unit was constructed in 1957 at the No. 2 refinery as part of a $475,000 program.

3. Construction of a chemical emulsion treatment plant in 1951 (at cost of $140,000) to break emulsions skimmed from the separator.

4. Provided facilities to skim oil from river at Kingsbury Run slip regardless of original source (at cost of $35,000).

5. Provided facilities to collect and convey ship ballast to oily water separators ($30,000).

6. Provided recycle system for water normally discharged to the river ($80,000) - (Difficulties in developing proper fire foam has prevented continuous operation.)

7. Provided vacuum filter for solids removal and disposal ($180,000).

8. Change in processes (for example, eliminating acid treatment which in turn eliminated acid wastes).

9. Positive and continuing program of good housekeeping to prevent spills or other losses.

There has been a decrease in the volume of

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waste water discharged to the river and a reduction in oil lost to the river.

At the No. 2 refinery the oil loss in 1951 average 23 barrels a day but was down to 0.1 barrel a day by 1964.

This total program has produced much improved waste control at a total cost of approximately $2,000,000.

Paper Products

There are two companies in the Cuyahoga River basin producing paper products. The waste waters from paper mills carry solids -- fiber from wood or paper -- which settle in the stream and decompose. The deposits below a paper mill are unsightly and use up the oxygen in the stream.

In order to reduce loss of fiber, paper companies install fiber recovery equipment called saveails. The recovered fiber is used in paper production. However, saveails are not sufficient to remove all fibers and thus additional treatment facilities must be provided.

In some instances paper mills use chemical solutions for coating or sizing which, if discharged to the river, use up much oxygen. Special controls and treatment are needed for such material.

Forrest Products Division of Owens-Illinois located in Northfield Township, Summit County, has installed inplant recovery of paper fiber and clarification of the wastewaters before discharge to the river. During the summer further treatment is provided by land spray disposal.

Sonoco Products Company took over the Munroe Falls Paper Company in 1960. Since then the company has installed saveall equipment for recovery of fiber. Subsequently, the company provided a lagoon for removal of the remaining settleable materials. Aeration equipment also has been added to the lagoon. The company has recently determined to discharge their wastes to the new Mud Brook interceptor sewer. Lagoon facilities will be provided for solids removal until this sewer is completed.

In summary there are 42 waste permits in the 32 companies which discharge wastes to the streams of the Cuyahoga River basin. Twenty-one of these permits are considered as having currently acceptable facilities. Of the 21 with inadequate facilities, 2 have facilities under construction, 5 plan to connect to municipal sewers, one is preparing plans, and the remaining 13 (including 4 discharges of pickle liquor) have studies under way.

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Remaining Problems

The waste treatment construction program in the industrial and urbanized complex of the Cuyahoga basin is making significant strides in reducing wastes discharged to the river. Until the program is completed there remains problems of low dissolved oxygen, oil, color, sediment, debris and in some areas bacterial pollution. I don't think we have to expand further on that, for those who took the boat ride the other day.

The rapid population growth of the Summit County area has increased the usage of waters of the upper Cuyahoga basin for public water supply. Not only does this further reduce the low flow in the river during critical periods, it also increases the proportion of flow in the river below Akron as treated wastewater. Under these conditions even the best available secondary treatment processes will result in low dissolved oxygen downstream from the City of Akron as well as the City of Kent. Some means of low flow augmentation or further treatment will be required for solution of this problem.

Downstream from Kent there are excessive algal blooms triggered by the Nutrient from the sewage treatment plants.

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Oil not only comes from refineries and steel rolling mills but is discharged by gasoline stations and private citizens via storm sewers. Another source of the oil is the unauthorized pumping of bilge water from cargo ships. All possible means should be utilized to prevent oil from being discharged to the river. Even so some oil will get to the river. Industrial and city officials have been studying this matter and are presently in the process of obtaining facilities for periodical removal of the oil from the water.

Debris, mainly from unauthorized dumps along the banks of the river, is a problem which local authorities must recognize and control. In some instances debris removal from the water surface of the river could be accomplished with the removal of oil.

Sediment load, solids in waste discharges and the run-off from the Cleveland area contribute to the 850,000 tons dredged per year from the navigation channel and Harbor. It has been indicated that soil conservation practices would have only a minor effect in reducing the sediment load originating above Independence. It appears pertinent to bring up the question at this time as to the advisability of dumping the materials dredged from this area into the lake just beyond the breakwater, and this has already been discussed.

In spite of all efforts so far, some color remains in the waste discharged from steel mills and other industrial processes. Further work is needed to solve these problems.

For the protection of areas of the stream suitable for recreation and readily accessible to the public, adequate disinfection of all sources of sewage discharges must be provided.

Water Quality Analysis

The State of Ohio has been working with cities and industries on the Cuyahoga River in a joint development of needs and remedies to provide water quality in the Cuyahoga adequate for the area needs. The committee (The Cuyahoga River Basin Water Quality Committee) which was established and has been meeting regularly, set up subcommittees on water quality analysis, debris collection and other specific problems.

The committee has made preliminary surveys on the river and after evaluation of the data, scheduled detailed surveys on the river to determine water quality and evaluate sources of influence, natural and man made.

The committee expects to offer recommendations on water quality controls. The data collected by the committee is shared with the State and has been offered to the U. S. Public Health Service for use in their model studies with the stipulation that all of the data deemed pertinent by the State is included in the study. The objectives were to make certain that adequate data are used and that the model would be available to the State for review of changing conditions.

The PHS survey data has been limited to once a week samples. The committee data is collected by intensive sampling over a period of time and at scheduled flow and temperature conditions. Also, at the time of sampling the river, the individual plant discharges are determined. The PHS agreement to this cooperative effort has not yet been given.

The companies have been reluctant to release waste load data for public review because of possible misinterpretation. When offered to the State or to the committee the data are correlated with effects on the stream to determine responsibility and importance.

The waste load data reporting at any time is a part of a continuing program of waste control. The magnitude of the load in itself does not describe effect, possibilities of control or plans for control.

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For example, the three steel companies in the Cleveland area discharge about 48,000 pounds of ferrous iron a day in spent acid. The iron causes a color problem as it oxidizes. The iron also coagulates in the stream and precipitates, forming sludge deposits when the ferrous iron concentration is sufficiently high. The effects thus vary with flow conditions.

As part of the program reported to the State, these companies will have converted their pickling operations to hydrochloric acid with recovery of the spent acid by 1969. This will be done in stages so partial removal will be effected by 1967. (See Appendix A)

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MINOR TRIBUTARIES

General

The drainage areas covered by this section of the report includes those drained by the Portage, Sandusky, Huron, Vermilion, Black and Rocky Rivers which are located between the Maumee and Cuyahoga River Drainage Basins and Chagrin, Grand, and Ashtabula Rivers, which are located in northeastern Ohio. The basins in general have steep slopes in the headwater areas and very flat slopes in the Lake Plain areas. In general, stream flows during the late summer are extremely low.

Population

The population of the drainage area of the minor tributaries is approximately 500,000 persons of which 90% live in communities with public water supplies. The two largest cities in the area are Lorain and Elyria accounting for 20% of the total area population. Thirteen other cities have populations ranging from 10,000 to 20,000 persons.

Economy

Approximately 80% of the land area of the drainage basins west of the Cuyahoga basin is farm area whereas less than 60% of the land area in the northeastern basins is in such use. A major portion of the industries in the western basins are in food processing, however, there are major manufacturing plants in the areas of Toledo, Sandusky, Elyria, Lorain,Brook Park and Parma Heights. In contrast, there is a predominance of chemical industries in the northeastern minor tributaries. The industrial growth in this area has been very rapid in the last ten years and will likely continue.

Water Uses

The municipal use of water in the western group of the minor tributaries amounts to 47 m.g.d. of which 27 m.g.d. is obtained from Lake Erie, 16 m.g.d. from inland surface sources and the remainder from underground sources. The major inland surface supplies are obtained from the waters of the Sandusky, Huron, Black and Rocky Rivers. Municipal use of water in the eastern group of minor tributaries is nearly 18 m.g.d. of which 14 m.g.d. is obtained from Lake Erie, 1.2 m.g.d.

from inland surface sources and 3 m.g.d. from underground sources. The major inland surface supply is obtained from Conneaut Creek.

Use of water in the area of the western minor tributaries for manufacturing amounts to 212 m.g.d. of which 202 m.g.d. is obtained from inland surface sources, 2 m.g.d. from Lake Erie and 8 m.g.d. from underground sources. The major inland surface source is the Black River in the area of Lorain. The use of this water is primarily for cooling water. In the eastern tributaries 288 m.g.d. of water is used of which 285 m.g.d. is obtained from Lake Erie, and 3 m.g.d. from inland surface supplies. Over 93% of the industrial use of water is for cooling purposes.

Sport fishing is carried on in some reaches of the Sandusky, Huron, Vermilion, Black, Rocky and Chagrin Rivers.

Municipal Sewage Treatment

There are 25 cities in the drainage of the western minor tributaries of which 16 provide secondary treatment, 2 intermediate treatment, 4 primary treatment, and 3 provide no treatment of their sewage. Twelve (12) of the 16 secondary treatment, the 2 intermediate facilities, and 3 primary facilities are classed as currently acceptable, at this time to the Ohio Water Pollution Control Board. Of the inadequate facilities enlargements are under construction for 2 secondary plants and plans of enlargement to the other two are in preparation. Plans for adding secondary facilities to one inland city with primary facilities are in preparation. Of the 3 cities with no treatment, one has facilities under construction, detail plans for another have been approved, and plans for the third city are under preparation.

Only three cities discharge their waste to the streams of the eastern minor tributaries. One provides secondary treatment and the other two provide intermediate facilities. The intermediate facilities are currently acceptable whereas the secondary plant currently is overloaded. Enlargement of this plant is now under construction. Pertinent information with respect to the facilities provided by each municipality is given in Table 3A. A review of this table will show that 18 of the 32 villages provide treatment facilities. Of the 14 without treatment one has facilities under construction, and 7 are preparing plans of facilities. The remaining villages have minor pollution problems and/or lack the necessary finances to construct facilities.

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Municipal Sewage Collection

Thirteen cities provide separate sewage collection systems, 8 others have both separate and combined systems, and four have only combined systems. Further study is needed to determine the sewerage needs of those cities with extensive combined systems.

Industrial Wastes

Of the 35 industrial waste discharges to the western minor tributaries, 31 are provided with currently acceptable treatment facilities. Of the four with inadequate facilities, one has plans in preparation, one is carrying out studies, one needs improved operation, and the fourth plans to connect to municipal sanitary sewers. Of the 46 industries that discharge waste to the eastern minor tributaries, 35 have currently acceptable facilities, 9 are inadequate and the status of the others needs to be studied. Of the 9 inadequate facilities, 4 are planning to connect to municipal facilities, one has facilities under construction, 3 have prepared plans of treatment facilities and one is carrying out studies.

Although a number of the industrial plants in Ashtabula County have provided facilities which provide adequate treatment of their individual wastes, the interaction of the wastes from the various companies still produce unsatisfactory conditions in the receiving streams. In order to solve this problem the Ohio Department of Health has directed these companies to jointly study their problem and prepare a joint program of correction measures. Pertinent information with respect to the industrial waste problem of each of the industries is given in Table 3B.

Remaining Problems

As in the Maumee River basin the low stream flows during the late summer period in many of these tributaries do not provide sufficient dilution for the assimilation of the waste loads from well operated secondary treatment plants. At times no flow for an entire month has been observed in the Ashtabula and Vermilion Rivers. Other low flow areas are Bowling Green, Fostoria, Bucyrus, Fremont, Norwalk, Elyria, and Oberlin. In the previously cited 1899 report of the Ohio State Board of Health low D.O.'s and algae problems were observed in most of these same areas. Then, as now, the control of nutrients from agricultural runoff is still a problem in some of the western tributaries. Additional needed improvement is disinfection of those discharges which affect waters suitable for recreation.

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OHIO'S LAKE ERIE SHORELINE

This section of the report deals only with those areas along the shoreline that are not part of any recognized tributary drainage area.

Water Uses

Some 2,000,000 persons or about two-thirds of the population of the Lake Erie watershed in Ohio obtain their water supply from Lake Erie. The municipal water works which obtain their supply from Lake Erie pump on an average of 430 m.g.d. Manufacturing plants which obtain their water supply directly from Lake Erie use nearly 294 m.g.d. In addition, approximately 1920 m.g.d. of the water obtained from Lake Erie and its back waters is usedfor electric power production.

In addition to these major water supply uses the waters of Lake Erie are used extensively for bathing, boating, and fishing. There are 28 public bathing beaches along the Ohio shoreline.

Municipal Sewage Treatment

The sewage from six cities, four villages and one county sewer district is discharged directly to Lake Erie. Of the facilities provided by the cities, four are considered currently acceptable and two - the Cleveland Westerly plant and the facilities of Lakewood - are currently inadequate. A new plant to serve the city of Lakewood has just been constructed and will be placed in operation in the near future. The new Lakewood plant plus the Easterly plant of the city of Cleveland provide secondary treatment. The other municipal plants provide intermediate chemical treatment during the summer season. Disinfection of the effluents of these plants is provided during the bathing season.

Two villages provide primary treatment with disinfection of their effluents during the bathing season; these are considered as currently acceptable. There are only two villages (630 persons) without treatment. Plans are being developed for treatment plants. One large county sewer district plant serves the cities of Rocky River, Bay, and Fairview Park. This plant provides intermediate treatment with disinfection of the effluent.

Municipal Sewage Collection

The cities of Ashtabula and Euclid, as well

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as the villages of Geneva-on-the-Lake and Vermilion-on-the -Lake, have separate sanitary sewer systems. However, significant areas of the cities of Cleveland, Lakewood and Avon Lake are served by combined sewer systems. The combined sewer system of the City of Cleveland has over 300 relief overflows which discharge at the shoreline of Lake Erie. The sewage flow in a number of the combined sewers in Cleveland exceed that for which they were designed. This factor, plus increased storm run-off as the result of built up areas, has increased the amount of untreated sewage discharged to the Lake. Unfortunately, some of these discharges take place at or near the beaches in the Cleveland area and thus render them unsuitable for swimming. As a step towards correcting this problem, the Ohio Water Pollution Control Board in February 1965, directed the city to prepare a program by August 15, 1965, for the elimination of pollution of Lake Erie shore waters in the Cleveland area.

Industrial Wastes

There are ten industrial establishments which discharge industrial wastes directly to Lake Erie. All provide waste treatment facilities. The facilities of seven of these establishments are currently acceptable.

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Those with inadequate facilities include a metal finishing plant, an electric generating station, and a synthetic fiber producer. The Ohio Water Pollution Control Board has directed that additional facilities be provided.

Problems

The effect of individual sewers, storm and combined, which discharge onto or adjacent to beaches has been well defined. Diversion of such discharges by connection to the sewage treatment plants would permit utilization of these beaches.

The discharge of chlorides from chemical plants in the Grand River area remain a problem for which no solution has been devised.

The other industrial problem now receiving attention is the control on the loss of zinc from the fiber company.

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APPENDIX A

STATEMENT OF
REPUBLIC STEEL CORPORATION
RE: CLEVELAND DISTRICT STEEL PLANT
AND BOLT AND NUT DIVISION PLANT
PRESENTED TO THE
OHIO WATER POLLUTION CONTROL BOARD

JUNE 8, 1965

COLUMBUS, OHIO

Mr. Chairman and members of the Ohio Water Pollution Control Board:

I am Louis F. Birkel, a professional sanitary engineer, and have worked in the field of industrial waste control for the past twenty years. I am presently employed by Republic Steel Corporation.

In response to the Board's invitation of May 6th, it is my pleasure today to outline for you Republic's waste control programs as they apply to the Cleveland District steel plant and the Bolt and Nut Division plant. Both are located in the City of Cleveland, except for a portion of the steel plant's strip mill facilities, and both occupy land adjacent to the

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Cuyahoga River.

As many of you know, Republic has long been active in the field of industrial waste control. Waste control laboratories are maintained at the company's Research Center in Independence, Ohio, and all basic steelmaking plants. These plants also have monitoring equipment and sampling stations which provide continuous data for use in the development of waste control objectives.

Today, I am pleased to be able to report that many of these objectives have been met. Work now in progress and our plans for implementing our waste control goals will be covered later in this report. We are well aware that much remains to be done and assure this board that we will continue to search diligently for workable and economically feasible solutions to the problems that remain.

Now, in keeping with the purpose of this report, let me begin by briefly reviewing our past accomplishments at the Cleveland District and Bolt and Nut Plant in order that you may see our present work and future plans in their proper perspective.

A five-year program to intercept and collect all sanitary sewage from the Cleveland District plant so that it is discharged to the City of Cleveland sewer

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system was completed in May of this year.

Sewers have been constructed and connected to the City sewer system in the Westside Blast Furnace area, the Shop area, Steel Plant, No. 1 Coke Plant and Car Repair Yard.

The sewers for the Strip Mill area, Eastside Blast Furnace, and the No. 2 Coke Plant have been constructed this year and were completed last month.

This has eliminated the discharge of untreated sanitary sewage from Republic plants that employ approximately 9,500 people.

Coke Plant

There are two coke plants in the Republic plant. All ammonia still wastes from both coke plants are collected and treated in a new dephenolizer which removes the phenols from the coke plant wastes and recovers the phenol.

A new napthalene recovery unit has also been placed in operation and the benzol plant water is disposed of by using it for quench water on the hot coke. This eliminates any discharge from this operation.

With the controls on sanitary sewage and coke plant wastes, we have removed or treated those wastes which could have the most detrimental effect on the lake, particularly as a drinking water source. Priority was given to these programs with the knowledge and agreement of your staff.

Acid

The next constituent in the waste from this steelmaking and finishing complex is the spent acid used for pickling. Some steps have been taken to minimize the effect of the acid discharged. Dry cleaning methods have been substituted for sulfuric acid in two operations in the Steel Plant, thus eliminating batch discharges. Also, controls have been installed on the discharge of acid from the continuous picklers so that the effects are minimized. Batch dumps were eliminated. The acid is now discharged at a controlled rate. Data collected indicate that the alkalinity and pH of the water is affected very little by the discharge of the continuous picklers. However, the problem of iron salts, color and flocculation in the stream remains. We feel the elimination of the pickling acid will be the major step towards solving the color problem in the Cuyahoga River.

You, of course, are all familiar with the history of the pickle liquor problem in the steel industry and there is no reason to dwell on the investigations, pilot plant work and research for a feasible method for treatment or elimination of sulfuric acid from continuous strip picklers.

Some companies have drilled deep disposal wells and are discharging their spent acid to formations deep under ground. In some areas, this is a feasible method, and until the advent of hydrochloric acid, was the only possible solution to this problem in old plants with limited space. It is my understanding that this method has not been approved in Ohio.

With the construction of Republic's new pickle line with recovery of hydrochloric acid (HCl) at our Southern plant in Gadsden, Alabama, a new approach was shown to be possible. At our Southern acid recovery plant, there have been operating problems and costs have been high. Nevertheless, we plan to move ahead with a similar recovery program at Cleveland. This step is a costly one and not without some risk of failure.

Subject to possible delays beyond our control, the schedule for this program is as follows:

1. One continuous line is currently being rebuilt so that the hydrochloric acid can be used. This modification is to be completed during early 1966. Oper-

ation of this unit will further implement testing of HCl pickling in horizontal lines which has been done at our Warren District plant.

2. A new hydrochloric acid reclamation plant with sufficient capacity to recover the acid from this line as well as the new pickling line to be built in connection with our announced expansion and construction of the new 84" Tandem Mill. The acid reclamation plant is scheduled for completion during the last quarter of 1967. This will provide time to operate and modify the unit so that operating problems will be worked out before it become necessary to recover the larger amounts of acid anticipated from the new pickling facilities.

3. The new pickling facilities will be in operation in 1968 and the acid recovered.

4. Our No. 3 line will be rebuilt and converted to HCl and the acid recovered. This is scheduled for completion in 1969. At that time, our No. 2 line will be phased out. In 1969, all pickling will be by hydrochloric acid and no pickling acid will be discharged into the Cuyahoga River.

Flue Dust

The heated air which reduces ore, coke, and

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limestone to molten iron in the blast furnace swirls up to the top of the stack carrying with it fine particles of raw material, mostly iron oxide. As the dust laden gas travels through the "down comers", the flue dust is deposited by gravity in a dry dust catcher.

However, some of the finer iron oxide particles are not removed in the dust catcher and require further treatment. The fine particles are washed out of the gas by water scrubbers and the dust laden liquid flows to large settling basins called thickeners where the particles settle to the bottom in a thick sludge, permitting the cleaned water to flow back into the river.

The accumulated flue dust is removed from the thickener and eventually is recharged back to the blast furnace.

The six blast furnaces located in two separate areas are served by the three thickeners and other necessary appurtenances such as vacuum pumps, vacuum filters, and conveyors. Four furnaces on the west side of the river are served by two thickeners, 70 feet in diameter. The two furnaces on the east side of the river are served by one thickener, 120 feet in diameter.

The operation of these facilities is difficult because of the large volume of flow and the large tonnage of solids which must be handled each day. Operation is a continuous problem, and in an old plant with interconnecting sewers, it is extremely difficult to bottle up all solids at all times. These facilities are being policed constantly by our own organization and, while there are operating problems, improvement has been made. In the foreseeable future, additional sintering capacity will be built which will eliminate one of the problems facing us now in that we do not have the capability to reuse all the solids recovered and thus they must be hauled away and disposed of on land. In construction of new sintering facilities, it is anticipated that the removal and handling of flue dust from gas washer water will be refined, although plans are not yet definite.

The thickeners remove a large percentage of the solids. In terms of concentration, there is no problem. However, the finely divided solids of small particle size, which remain after plain sedimentation in the thickeners, do pose a problem in that they add color to the water in the vicinity of the discharge. While this is a problem, the Cuyahoga River is naturally turbid by virtue of carrying a heavy silt load and thus we feel the problem should be more clearly defined before ultimate requirements are set.

Continuous flow measurement and sampling equipment has been installed on the outfalls of both thickener installations. These provide continuous monitoring of the effluent concentration and flow from these facilities and are part of the overall policing of the operation. Any discharge of unusual amounts of solids is quickly apparent. The results of the sampling are reviewed, not only in the District, but by the Waste Control Division.

Mill Scale

The manufacture of various steel products entails rolling hot metal into desired shapes. Hot steel oxidizes rapidly in air and this scale of iron oxide is removed and drops off in the rolling process. Water is also used on the rolls for cooling and scale removal, resulting in waste water containing scale and any oil which may have leaked from the lubrication and hydraulic systems of the mill. The scale bearing water drops into a flume and flows to a settling tank -- commonly called a scale pit.

There has been a continuing program to improve the recovery of scale bearing wastes from all mill areas.

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A new scale recovery system, as well as a system for the reuse of treated wastes was placed in operation for the new 10" mill which was constructed in 1962. This system was constructed so that most of the waste from the mill can be reused. This is an additional operating cost, but was instituted with the construction of new facilities so that the volume of waste would be reduced. Simultaneously with the construction of this system, the volume of waste from the adjoining 12" mill was further reduced as the cooling water from the reheat furnaces was removed from the scale pit serving the 12" mill, thereby increasing its efficiency.

A recycle system for the cooling water from the 98" strip mill runout tables was placed into operation in 1964. This recirculation system was designed to increase the efficiency of scale recovery in the existing 98" scale pit by eliminating approximately 10,000 gallons per minute which formerly was discharged through the pits serving the mill.

Previously a dry drag, which is a unit that periodically pulls a bucket under the roughing stands of the 98" mill to remove the scale from under the mill without the use of sluice water, was installed. This, again, reduces the flow and the volume of solids which must be removed in the scale pit.

New baffling and oil facilities have been installed in the 44" mill scale pit to recover oil and improve the sedimentation efficiency for the recovery of scale. By installation of proper baffling so that the flow characteristics through existing pits is improved, considerable additional scale can be recovered. Baffles have also been installed in the 12" mill scale pit and oil removal equipment will be installed.

An improvement program for the 18" mill is now under construction and will consist of baffling and oil recovery facilities. Formerly, these units had no baffling and any oil which escaped from the lubrication or hydraulic systems into the water went to the river. Even though these pits are small by comparison with units which would be constructed today, large amounts of oil can be trapped and removed by proper baffling and oil removal equipment.

The removal of scale from these existing pits, which are usually deep in the ground and surrounded by mill buildings and equipment, is most difficult. The scale must be removed by clam shell which is a continuous operational problem. As a possible remedy, we have developed, with one of the equipment companies, a con-

George H. Eagle

tinuous drag unit which can be put into an existing pit and removed for maintenance when necessary. By virtue of the fact the pits will be cleaned continuously, this automatic system will further increase the efficiency of both oil and scale removal.

Engineering is in progress for the installation of this equipment on the 44" mill which produces considerable volume of scale per day, and is scheduled for completion in the first quarter of 1966. If the unit proves satisfactory, it will be installed on other mills as rapidly as possible. This program completes what one might call the primary treatment program. It should be understood that these pits, by comparison with what would be built today for new facilities, are relatively small. However,we are dealing with a material which has specific gravity of 3.5, is inert, and settles very rapidly. By extending the pit, if space is available, the increase in efficiency, in terms of reduction of concentration of suspended solids, is relatively minor. In an old plant, such as the Cleveland plant, we cannot go to the end of a sewer which discharges to the river and build a final treatment facility because at that point we have not only the waste from the individual scale pit but also all cooling water and all storm water from the entire area. Thus the volumes involved are such that treatment plant space simply is not available. One might compare this to the problems facing cities, such as Cleveland, with combined sewer systems. If the systems were to be constructed over again, they would be entirely separated so that all wastes would be treated. If we are going to make any improvement,we must go back to the source of the waste where, again, we have space problems. In the construction of new facilities, however, this has been taken into consideration. In addition, many of the primary mills -- blooming mills, billet mills -- which are now old, will be replaced in the foreseeable future by continuous casting units which will change the picture completely.

With the elimination of the acid, the effects on the stream of the discharge of these inert solids and residual oil can be further evaluated. It should be recognized that the discharge of solids does not adversely affect the Lake. They do not affect the soluble iron concentration as they exist as iron oxide, an inert solid. We cannot, at this time, provide a schedule of construction which will eliminate the discharge of all solids of this nature. In fact, under present conditions, it is not technically feasible to meet a requirement calling for the total elimination of inert solids. Also, with the Cuyahoga River carrying a large silt load, the discharge of these solids can be compared to the sand and fine particles of clay carried from natural drainage. However, new methods are continually being evaluated and as developed, will be incorporated with new facilities.

Oil

In hot roll operations, oil is not a planned part of production. It is lost to the waste stream as a result of inevitable leaks in the hydraulic and lubrication systems. In cold rolling, oil is used for a lubricant and coolant in the production of cold reduced strip.

With the completion of the program outlined with respect to mill scale, the Steel Plant and the 98" Strip Mill will have in operation what could be termed primary oil removal. Also, we have in operation a continuous program of maintenance to detect and eliminate leaks of oil from each of the mills.

There remains the question of oil from the cold reduction mills. In these mills a soluble oil is used which is recycled. We have equipment on order for handling soluble oil at the 72" mill. Construction is expected to be completed in the fourth quarter of 1965. This system will provide for continuous cleanup and recycle back to the mill. This should eliminate any overflow or discharge of soluble oil.

The latest and best equipment for oil recovery and treatment will be incorporated in the construction of our new 84-inch tandem mill.

This leaves the 54" and 98" Tandem Mills. It is expected that with the construction of the new mill, the 98" mills's operation will be phased out, thus eliminating this problem. If the system under construction for the 72" mill proves feasible in operation, a similar unit will be constructed immediately for the 54" mill. It should be recognized that the treatment of soluble oil is extremely difficult. With the construction of our announced expansion, substantial progress will be made toward solving this problem of soluble oil.

General

We feel that the removal of debris and oil recovery from the river is practical and are willing to lend our support in the institution of such a program. It should be recognized that there are many sources of oil in the Cuyahoga River including bilge water from many boats. Therefore, we feel that additional measures should be instituted to recover oil directly from the river. We do recognize the best program is elimination at the various sources and we will continue to work to this end.

BOLT AND NUT DIVISION

Republic also operates the Bolt & Nut Division on the Cuyahoga River. Water from the Cuyahoga is used and effluents are returned to the Cuyahoga River. Following is a brief summary of the status, accomplishments, and future plans for this plant:

Sanitary

All sanitary wastes have been collected and are being discharged to the City system.

Mill Scale

The scale pits serving the bar mill at this plant have been effectively modified for increased scale recovery and oil separation.

Acid

Pickle liquor wastes originating at this plant are virtually neutralized by aspirating the acid from the vats with City water and diluting it about 3 to 1 before discharge to the river. Normally, a very small quantity of acid is discharged per day. Also, dry cleaning methods have been substituted for cleaning about 20% of the product, thus reducing the amount of acid used.

Plating Wastes

In response to questions raised by your staff relative to the discharge of rinse waters from our plating operations at this plant, we are currently re-evaluating this problem. On the basis of our preliminary findings, we are developing a program calling for discharge of these rinse waters to the City system or treatment in an appropriate manner.

Sampling and Measuring Equipment

All intakes and important outfalls are monitored regularly. The most important ones are equipped with automatic sampling and flow measuring equipment.

We are cooperating with your staff through the Cuyahoga Water Quality Committee in the determination of existing quality and what future quality will be required.

The quality of the Cuyahoga River as it is now, with a few exceptions, meets recognized quality standards for present uses. With the elimination of pickle liquor and completion of the other programs outlined above, considerable improvement can be expected. At low flow conditions, the Cuyahoga is subject to reversal of flows as well as impoundment due to seiches on the lake. These factors make evaluation of the cause and effect of discharge of waste on the stream and on the lake extremely complex. It receives sewage effluent from a large number of communities and is heavily used before it reaches the industrial section. We believe that the orderly progressive program, as conceived by this Board, is achieving substantial success in reducing or controlling pollution of the Cuyahoga River and Lake Erie.

Republic has spent more than 9 million dollars on waste control programs and looks forward to continued cooperation in arriving at realistic and workable solutions to our remaining problems.

George H. Eagle

STATEMENT OF
JONES & LAUGHLIN STEEL CORPORATION
RE: CLEVELAND WORKS
PRESENTED TO THE
OHIO WATER POLLUTION CONTROL BOARD
JUNE 8, 1965
COLUMBUS, OHIO

Gentlemen:

My name is Laird P. Lias. I am Works Manager of the Cleveland Works of Jones & Laughlin Steel Corporation.

I want to express to the Board my appreciation for its invitation to take part in this informal discussion.

I am sure that meetings such as this will contribute significantly to public understanding of the problems and progress involved in water pollution control.

As you gentlemen know, Jones & Laughlin has been working toward elimination of water pollution sources from our Cleveland Works for several years ----- and we have made considerable progress. We have now reached the point at which only two water pollution problems still confront us. We are actively working to solve these problems,in cooperation with the State of Ohio.

Since 1957, Jones & Laughlin has spent approximately four million dollars on facilities to eliminate the discharge of pollutants into the Cuyahoga River. Additional millions will be required to complete the task.

In response to the request of your Secretary, Mr. G. A. Hall, I have prepared a brief resume of our accomplishments in the water pollution control field and the status of our uncompleted projects. I will review these briefly in chronological order, with your permission.

In December 1957, we put into operation a flue dust thickener, which separates solids from the water used in the blast furnace gas scrubbing system and the sinter plant, reducing these solids from the waste water discharged into the river to a rating point well below your required limits. In the near future this water will be recirculated. The solids are returned to the sintering plant for reprocessing into sinter for use in the blast furnace burden.

In the same year, we put into operation an oil recirculating system in our tandem mill, eliminating the discharge of oil from that mill into the river.

In May 1958, we installed scale pits at the blooming mill and reversing rougher, eliminating the pollution problem caused by the discharge of scale into the river. Scale which settles out in the pits is reprocessed through the sinter plant or the blast furnaces. These pits are equipped with oil skimmers.

In June 1959, we closed down our coke oven and by-product facilities, thus eliminating all potential waste discharges from the coke plant.

In December 1960, we completed the relocation of our plant sanitary sewer lines to connect with the Cleveland Sewage Disposal System.

In December 1964, with the construction of our new high-speed 80-inch hot strip mill, new water pollution problems presented themselves, which we solved by installing the most elaborate scale disposal facility on any operating hot strip mill in the industry. Traveling at twice the speed of older mills, the new mills generate a much finer scale.

This necessitated the construction of a new and larger primary scale pit to collect the regular scale, and two clarifiers, which by a process of secondary thickening and chemical additions, help collect the fine scale. Over three-quarters of this water is recirculated. This scale pit is also equipped with an oil skimmer.

This brings us to our two remaining problems---- waste pickle liquor and the discharge of a very small amount of dark red waste water from the cooling chambers of our basic oxygen furnaces and electric furnaces.

In each case we have been pressing toward a solution as fast as technological progress would permit.

In the case of waste pickle liquor, as an interim measure, and in compliance with a request by the Board, we have cooperated with the Board by controlling our discharge of spent sulfuric acid to avoid the dumping of large slugs of acid into the river at any one time. This takes advantage of the natural diluting action of the river to help neutralize the acid.

It may appear that progress has been slow, but we want to assure you that the search for a permanent solution to the problem of waste pickle liquor has had our constant attention. So far, there is no proved, working method of regeneration of spent sulfuric acid for use in steel plant pickling systems. This has caused us to look elsewhere for a solution. Within the past year, there has been a technological breakthrough which holds promise of eliminating the problem.

George H. Eagle

This involves the substitution of hydrochloric acid for sulfuric acid. Hydrochloric acid can be regenerated and used in a "closed" system.

Our evalutation and planning for the conversion to the hydrochloric acid process are nearly completed. Preliminary results to date indicate that we will be moving in this direction. If we do so, this will require new material and new equipment. We expect to eliminate the discharge of the spent acid by the end of next year.

The cooling chamber pollution problem has proven to be an especially difficult one to solve since two types of solids are involved. One is a heavy particle,similar to the scale which we collect in the scale pits. The other is a fine powder which is impossible to separate from the water in ordinary settling basins. This condensed fume, although very small in quantity, colors the water. It is a by-product of our giant percipitator air cleaning system installed as a part of a $10,000,000 program to control air pollution. Thus having solved the air pollution problem, we have backed ourselves into a water pollution problem.

We are investigating several pieces of equipment which show promise of being able to separate these fine particles from the waste water, and we expect to install one type or another.

At the same time, we plan to install a closed system so that the cooling chamber sprays, used to coll the hot gases emerging from the furnaces, will be using recirculated water.

Our hope is to place these facilities in operation next spring.

Thus, by the end of 1966 we expect to complete the elimination of all water pollution discharge from our Cleveland Works.

George H. Eagle

STATEMENT OF
U. S. STEEL CORPORATION
RE: TWO CLEVELAND PLANTS
PRESENTED TO THE
OHIO WATER POLLUTION CONTROL BOARD
JUNE 8, 1965
COLUMBUS, OHIO

My name is G. A. Howell. I am Assistant to the Administrative Vice President - Engineering, U. S. Steel Corporation. I am pleased to appear here in response to the Board's invitation for the purpose of discussing the pollution abatement progress and program of our two plants in the Cleveland area.

At the outset I would like to remind the Board that the steel industry was the first industry in Ohio to have all of its plants submit voluntarily to the Board's permit program pursuant to its policy statement of February 24,1953. Furthermore, the two Cleveland plants of U. S. Steel were among the first participating plants. This eliminated the necessity of expensive and prolonged hearings on each type of steel waste.

George H. Eagle

The products we produce in the Cleveland plants are primarily wire, rods, cold rolled strip, and merchant iron. In the production of these products the wastes generated are relatively small and consist of spent pickle liquor, mill scale, flue dust and oil. Most of these wastes are collected and thereby prevented from entering the Cuyahoga River.

U. S. Steel's efforts to alleviate this water pollution problem in this area have led to the installation of special equipment. For example, a scale settling pit was installed in conjunction with the construction of the new Rod Mill at Cuyahoga Works to minimize the amount of mill scale discharged. Short blasting units were installed on the Heavy Duty Strapping lines for mechanical scale removal which eliminates the necessity of removing scale with acid.

Also at Cuyahoga Works, scale breaking sheaves have been installed on three wire drawing machines. This has reduced acid cleaning substantially.

Further, at Cuyahoga Works, a receiving tank with pumps and controls was installed to provide controlled neutralized discharge of the remaining waste pickle liquor.

At Central Furnaces, a clarifier for each of the two furnaces was installed to collect flue dust. Recently, we also installed an orifice washer which reduced the amount of water used, and consequently the effluent discharged into the river by about 30 per cent.

About three years ago we closed our Cleveland Coke Plant and its by-product facilities eliminating all coke plant wastes.

At Central Furnaces we discharge sanitary wastes into the Cuyahoga River. We have done this under a permit which would have subsequently required us to tie into a proposed interceptor sewer planned for this area by the City. We were in regular contact with the city and had developed plans to segregate and discharge sanitary wastes into the city system as originally planned. However, on November 13, 1964, the city advised us that their original plans had been abandoned and they recommended that our sewage be routed to the existing Broadway sewer. Our engineering is progressing in accordance with the city's new plan and we expect to make this connection by mid - 1966.

We have made substantial progress in eliminating and reducing mill scale and oil wastes and, we are presently designing baffles and oil skimmers for the scale pits which will further reduce the escape of mill scale and oil. These additional facilities will be installed by the end of 1965.

As the Board knows, the most difficult problem of waste disposal for the steel industry is acid waste. However, by reason of the smaller size of our operation in Cleveland, the nature of the products produced here and the facilities already installed, the quantity of acid used is relatively small.

We are continuing to study several methods for solving our remaining waste acid problem and we are confident that by mid-1967 we shall have that problem solved to the Board's satisfaction.

(Appendix B to the above report is as follows:)

APPENDIX B

TABLE 1A

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
(MAUMEE RIVER BASIN)

Community	Receiving Stream	1960 Population	Type of Treatment	Date Built	% Red BOD	Status	Type Sewer	Remarks
Cities								
Bryan	Trib. of Tiffin R.	7,361	Secondary	'40, '62	90-95	CA	C	
Defiance	Maumee R.	14,553	Intermediate	'57	50-55*	CA	S-C	
Delphos	Trib. of Auglaize R.	6,961	Secondary	'31, '55	87-91	CA	C	
Findlay	Blanchard R.	30,344	Secondary	'31, '54	90-93	CA	S-C	
Lima	Ottawa R.	51,037	Secondary	'31, '55	90-95	CA	S-C	
Napoleon	Maumee R.	6,739	Secondary	'59	85-90	CA	S-C	
Perrysburg	Grassy Cr.	5,519	Intermediate	'59	50-70*	CA	C	
St. Marys	St. Marys R.	7,737	Secondary	'49	80-85	CA	S	
Sylvania	Ten Mile Cr.	5,187	Secondary	'57	60-80	CI	S	Plans of impvts appr.
Toledo (1)	Maumee R.	318,003	Secondary	'31, '59	75-85	CA	S-C	
Van Wert	Trib. of Auglaize R.	11,323	Secondary	'35, '56	85-90	CA	S-C	
Wapakoneta	Auglaize R.	6,756	Secondary	'36, '57	70-90	CA	S-C	
Village								
Ada	Trib. of Ottawa R.	3,918	Secondary	'57	90-95	CA	C	
Antwerp	Maumee R.	1,456	None	--	--	CI	--	Detail plans ordered
Archbold	Trib. of Tiffin R.	2,348	Secondary	'61	90-95	CA	C	Trib. load 23,500 P. E.
Bluffton	Trib. of Blanchard R.	2,591	Secondary	'54	90-95	CA	C	
Columbus Grove	Trib. of Auglaize R.	2,104	Secondary	'37	80-90	CI	S	Plans of impvts appr
Continental	Trib. of Auglaize R.	1,147	Secondary	'58	85-95	CA	C	
Convoy	Trib. of Auglaize R.	976	Secondary	'39	80-85	CA	S	

TABLE 1A Continued

Community	Receiving Stream	1960 Population	Type of Treatment	Date Built	% Red. BOD	Status	Type Sewer	Remarks
Cridersville	Trib. of Ottawa R.	1,053	None	--	--	CI	S	Under construction
Delta	Bad Creek	2,376	Secondary	'58	90-95	CA	S	
Deshler	Brush Creek	1,824	Secondary	'53	90-95	CA	S	
Dunkirk	Trib. of Blanchard R.	1,006	None	---	--	Pmf	--	Minor Poll lack funds
Elida	Ottawa R.	1,215	None	--	--	CI	--	General plans approved
Fayette	Trib. of Tiffin R.	1,090	Secondary	'63	85-90	CA	S-C	
Forest	Trib. of Blanchard R.	1,314	None	--	--	CI	--	General plans
Hamler	Turkeyfoot Cr.	588	None	--	--	Pf	--	General Plans, Lack Finances
Haskins	Haskins Cr.	521	Primary	'39	30-35	CA	S	
Hicksville	Mill Cr.	3,116	Secondary	'35, '63	80-90	CA	C	
Holgate	Trib. of Turkeyfoot Cr.	1,374	None	--	--	CI	--	Prep Detail plans
Leipsic	Trib. of Beaver Cr.	1,802	Secondary	'58	90-95	CA	C	
Liberty Center	Dry Creek	867	None	--	--	Pf	--	Lack finances
Montpelier	St. Joseph R.	4,131	Primary	'58	15-20	CA	C	
New Bremen	Trib. of St. Marys R.	1,972	Secondary	'34	90-95	CA	C	
Ohio City	Trib. of Auglaize R.	851	None	--	--	CI	--	Needs finances & Detail plans
Ottawa	Blanchard R.	3,245	Secondary	'55	85-90	CA	C	
Ottoville	Trib. of Auglaize R.	793	None	--	--	Pmf	--	Minor Pollution, Lack Finances
Pandora	Trib. of Blanchard R.	782	None	--	--	CI	--	Financing under study
Paulding	Trib. of Auglaize R.	2,936	Secondary	'64	No Data	CA	C	
Payne	Trib. of Auglaize R.	1,287	None	--	--	CI	--	Gen. Plns. Approved
Rockford	St. Marys R.	1,155	Primary	'59	15-20	CA	C	
Sherwood	Trib. of Sulphur Cr.	578	None	--	--	CI	--	Need General Plans

TABLE 1A Continued

Community	Receiving Stream	1960 Population	Type of Treatment	Date Built	% Red. BOD	Status	Type Sewer	Remarks
Spencerville	Trib. of Auglaize R.	2,061	Secondary	'56	82-87	CA	C	
Stryker	Tiffin R.	1,205	None	--	--	CI	--	Under Construction
Swanton	Swan Cr.	2,306	Secondary	'58	70-85	CA	S	
Waterville	Maumee R.	1,856	Secondary	'58	75-80	CA	C	
Wauseon	Turkeyfoot Cr.	4,311	Secondary	'39, '64	85-90	CA	S-C	
West Leipsic	Trib. of Beaver Cr.	320	None	--	--	CI	--	Engineer hired
Weston	Tontogany Cr.	1,075	None	--	--	CI	--	Detail plans approved
West Unity	Trib. of Tiffin R.	1,192	None	--	--	CI	--	Req. general plans
Whitehouse	Trib. of Swan Cr.	1,135	None	'65	No Data	CA	--	

*Data for Primary Treatment. No data available for Intermediate Treatment

(1) The facilities of the City of Toledo also serve the cities of Maumee (12,063) and Oregon (6,000) and the Villages of Ottawa Hills (3,870) and Rossford (4,406).

Legend

CA	Currently Acceptable
CI	Currently Inadequate
P	Project postponed
m	Minor pollution
f	Lack of finances

TABLE 1B
STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
MAUMEE RIVER BASIN (including Ten Mile Creek)

Name	Location	Receiving Stream	Type of Wastes	Type of Treatment	Status	Remarks
Allied Chemical Corp. Plastics Division Glendale Plant	Lucas County Adams Twp.	Delaware Cr.	Organic Plastics	Holding lagoon conducts wastes to Toledo sanitary sewer	CA	
Bauer Canneries, Inc.	Hamler	Turkeyfoot Cr.	Organic Tomato Cannery	Holding lagoon	CA	
Beatrice Foods Co.	Auglaize County German Twp.	Huenke (Wierth) Ditch, St. Marys R.	Organic Milk Processing	Activated sludge, reuse of cooling water, land spray disposal of sludge and whey	CA	Discharge to dry stream containing New Breman STP effluent, 98% removal of B. O. D.
Bohror & Moore Packing Co., Inc.	Auglaize County Duchouquet Twp.	Auglaize R.	Organic Meat Packing	Land spray disposal	CA	Effective during critical stream periods
Buckeye Sugars, Inc.	Ottawa	Blanchard R.	Organic Beet Sugar	Holding lagoons, reuse of condenser water	CA	Facilities for reuse of condenser water recently installed
Buckeye Sugars, Inc.	Ottawa	Blanchard R.	Organic Tomato Cannery	Holding lagoons	CA	
Bundy Foods, Inc.	Blakeslee	Bear Cr., St. Joseph R.	Organic Tomato Cannery	Screening, to swale area	CA	
*Campbell Soup Co.	Henry County Harrison Twp.	Maumee R.	Organic Soup Cannery Tomato Cannery	Trickling filters for soup production, land spray for tomato operations	CA	Treatment provided satisfies receiving stream requirements
Central Foundry Div. GMC, Defiance Plant	Defiance County Richland Twp.	Maumee R.	Steel Foundry	Settling lagoons	CA	

*Surface filtration of tomato processing wastes unique method of treatment.

TABLE 1B Continued

Name	Location	Receiving Stream	Type of Wastes	Type of Treatment	Status	Remarks
Contris Packing Co.	Hancock Co. Liberty Twp.	Blanchard R.	Organic Slaughterhouse	Aerobic lagoons, seepage to river	CA	Over 94% removal of B.O.D.
Davison Chemical Div., W. R. Grace & Co.	Findlay	Howard Run, Blanchard R.	Chemical Fertilizer	Lagoons, most of flow to Findlay STP	CA	
Defiance Fertilizer Co.	Defiance Co. Noble Twp.	Tiffin R.	Organic Rendering Co.	Grease separation, open sand filters	CA	Very low stream flow
Diegel Canning Co.	Auglaize Co. Pusheta Twp.	Pusheta Cr., Auglaize R.	Organic Tomato Cannery	Broad land disposal	CA	No runoff
Donovan Steel Pickling Co., Div. of Donovan Wire & Iron Co.	Toledo	Swamp	Steel Acid-Iron	Lagoon neutralization	CA	Lagoon expansion planned
Edgerton Metal Products, Inc.	Edgerton	St. Joseph R.	Inorganic Metal Finishing	Cyanide oxidation	CA	
Ex-Cell-O Corp	Allen Co. Bath Twp.	County Ditch, Pike Run, Ottawa R.	Inorganic Metal Finishing Oil	Cyanide oxidation chrome reduction and ppt. oils to lagoon	CA	
Ford Motor Co. Lima Engine Plt.	Allen Co. Bath Twp.	Sugar Cr., Ottawa R.	Emulsified Oil Wastes	Chemical treatment and oil separation, lagoon	CA	
Foster Canning, Inc.	Napoleon	Van Hyning Cr., Maumee R.	Organic Tomato Cannery	Land spray disposal	CA	
The Fremont Kraut Co.	Liberty Center	Dry Cr., Maumee R.	Organic Kraut Production	Lagoon	CA	

TABLE 1B Continued

Name	Location	Receiving Stream	Type of Wastes	Type of Treatment	Status	Remarks
The Goodyear Tire & Rubber Co.	St. Marys	Armstrong Ditch, St. Marys R.	Metal Finishing, Rubber Parts	Chrome reduction in-plant controls part to city sewers	CA	
Gulf Oil Corporation Toledo Refinery	Toledo	Maumee R.	Oil Refinery	Oil separators	CA	
Interlake Steel Corp.	Toledo	Maumee R.	Steel, Blast Furnace	Clarification	CA	
Johns-Manville Fiber Glass, Inc. Plant No. 3	Defiance	Preston Run, Maumee R.	Phenolic	In-plant control	CI	Further in-plant containment to be provided
Johns-Manville Fiber Glass, Inc.	Lucas Co. Monclova Twp.	Maumee R.	Organic, Phenolic	Swale area	CI	Improvements required
Lectrolite Corporation	Defiance Co. Richland Twp.	Preston Run, Maumee R.	Inorganic, Metal Finishing	In-plant controls	CI	Improvements required
Libbey-Owens-Ford Glass Co., Rossford & Thermopane Plts.	Rossford	Maumee R.	Settleable Solids, Soluble Oils	Lagoons, emulsion treatment facilities	CA	94% removal of oil
Libby, McNeil & Libby	Leipsic	Brush Cr., Beaver Cr., Maumee R.	Organic Tomato Processing	Land spray disposal	CA	Runoff intercepted by Leipsic sewer system
Namco Div., Hayes Industries, Inc.	Spencerville	Six Mile Cr., Auglaize R.	Inorganic, Metal Plating	Acid neutralization settling	CI	Improvements required

TABLE 1B Continued

Name	Location	Receiving Stream	Type of Wastes	Type of Treatment	Status	Remarks
National Refining Co. Div. of Ashland Oil & Refining Co.	Findlay	Siddal Cr., Blanchard R.	Oil Refinery	API separator	CI	Incomplete control of oil
New Bavaria Canning Co., Inc.	New Bavaria	School Cr., Turkey-foot Cr., Maumee R.	Organic Tomato Cannery	Land spray disposal	CA	
Ohio Decorative Prod., Inc.	Spencerville	Six Mile Cr., Auglaize R.	Inorganic, Metal Finishing	Cyanide oxidation Chrome hauled away	CA	
Pandora Canning Co.	Pandora	Dutch Run, Blanchard R.	Organic, Tomato Cannery	Holding lagoon	CA	
Plain View Farm	Hancock Co. Van Buren Twp.	Higbie Ditch, Ottawa R.	Organic Milk Processing	Land spray disposal	CA	Land spray used during critical stream periods
Pride of Lima Provision Co.	Allen Co. Bath Twp.	County drain, Ottawa R.	Organic Meat Processing	Land spray disposal	CA	Primary treatment during non-critical stream periods
Republic Creosoting Co., Div. of Reilly Tar & Chem. Corp.	Allen Co. Bath Twp.	Ottawa R.	Phenolic, Wood Preserving	Separator and straw filters	CA	
Rusco Div. Rusco Industries, Inc.	Pandora	Riley Cr., Blanchard R.	Inorganic, Metal Finishing	Acid neutralization settling	CA	
Sharp Canning, Inc.	Ohio City	Lt. Auglaize R., Auglaize R.	Organic Tomato Cannery	Land spray disposal	CA	

TABLE 1B Continued

Name	Location	Receiving Stream	Type of Wastes	Type of Treatment	Status	Remarks
Sharp Canning, Inc.	Rockford	St. Marys R.	Organic Tomato Cannery	Land spray disposal	CA	
Sohio Chemical Co.	Allen Co. Shawnee Twp.	Ottawa R.	Organics	Lagoon	CI	In-plant controls being provided
Sohio Petroleum Co.	Allen Co. Shawnee Twp.	Ottawa R.	Organics Petro chemicals	Lagoon incineration	CI	Complete incineration facilities underway
The Standard Oil Co. Lima Refinery	Allen Co. Shawnee Twp.	Ottawa R.	Oil Refinery	API separator flotation unit	CI	Reducation of phenols required
Stokely-Van Camp, Inc.	Paulding	Opposum Run, Flat Rock Cr., Augalize R.	Organic Tomato Processing	Holding lagoon	CA	
Sun Oil Company Marine Terminal	Toledo	Maumee R.	Oil Loss	Separators	CA	
Sun Oil Company Wharf	Toledo	Maumee R.	Oil Loss	Separators	CA	
Toledo Edison Co. Acme Station	Toledo	Maumee R.	Power Plant	Lagoons	CA	
Toledo Edison Co. Water St. Station	Toledo	Maumee R.	Power Plant	Lagoons	CA	
Walter & Sons, Inc.	Auglaize Co. Duchouquet Twp.	Auglaize R.	Organic Meat Processing	Septic tank, sand filter	CI	Minor stream problem, unsatisfactory due to nuisance problem

TABLE 1B Continued

Name	Location	Receiving Stream	Type of Wastes	Type of Treatment	Status	Remarks
The Weatherhead Co., Ohio Div.	Antwerp	Maumee R.	Inorganic Metal Plating		CA	
The Weston Paper & Mfg. Co., Auglaize Div.	St. Marys	St. Marys R.	Organic Paper Mill	Land spray disposal and settling infiltration lagoon	CA	Over 98% B. O. D. reduction summer operation, over 60% B. O. D reduction winter operation
G. A. Wintzer & Son Co.	Augalize Co. Pusheta Twp.	Pusheta Cr. Augalize R.	Organic Rendering	Activated Sludge	CA	Over 99% B. O. D. reduction
Dana Corporation Toledo Division	Toledo	Sibley Cr., Ten Mile Cr.	Oil Treatment (Unclass.)	Chemical treatment and reuse	CA	
E. I. duPont deNemours & Co., Inc. Industrial & Biochemicals Dept.	Lucas Co. Washington Twp.	Direct	Chemical	Neutralization, settling monitored discharge	CA	Routine analytical controls
F. S. Royster Guano Company	Toledo	Direct	Chemical	Neutralization lagoons	CA	Routine ground water monitoring

Legend	
CA	Currently Acceptable
CI	Currently Inadequate

Page 1 of 2

TABLE 2A

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
(CUYAHOGA RIVER BASIN)

ommunity	Receiving Stream	1960 Population	Type of Treatment	Date Built	% Red. BOD	Status	Type Sewer	Remarks
Cities								
Akron(1)	Cuyahoga R.	290, 351	Secondary	'29, '57	70-85	CI	S-C	Prepare detail plans
Bedford	Trib. of Tinkers Cr.	15, 223	Secondary	'38, '54	70-90	CA	S-C	
Bedford Heights	Trib. of Tinkers Cr.	5, 275	Secondary	'59	75-85	CA	S	
Cleveland(So.) (2)	Cuyahoga R.	245, 000	Secondary	'27, '38, '56	75-85	CI	S-C	Imprvts. U. C.
Cuyahoga Falls(part)	Kellsy Cr.		Secondary		90-95	CA		Largely Trib. Akron
Independence	Trib. of Cuyahoga R.	6, 868	None		---	CI		Ordered prep. plans
Kent	Cuyahoga R.	17, 836	Primary	'54	40-45	CI	S	Sec. Fac. U. C.
Maple Heights(part)	Swan Cr.	3, 700E	Secondary	'55	40-50	CI	S	U. C. 88% Trib. Clev
N. Royalton	Trib. of Big Cr.	9, 290	Secondary	'63	---	CI	S	Under Construction
Ravenna	Trib. ofCuyahoga R.	10, 918	Secondary	'44, '56	90-95	CA	S	
Solon	Tinkers Cr.	6, 333	Secondary	'62	90-95	CA	S	
Talmadge(part)	Trib. of Lt. Cuyahoga	400E	Secondary	'62	90-95	CA	S	Mostly Trib. to Akron
Villages								
Burton	E. Br. Cuyahoga R.	1, 085	Secondary	'27, '61	75-80	CA	S	
Hudson	Brandywine Cr.	2, 438	Secondary	'62	75-85	CA	S	
Mantua	Cuyahoga	1, 194	Secondary	'15	80-85	CI	S	Prep. plans for impvt
Middlefield	Trib. of Cuyahoga R.	1, 467	Primary	'54, '57	No data	CA	C	
Munroe Falls	Cuyahoga R.	1, 828	None	---	---	CI		Will be Trib. to Akro
Northfield	Trib. to Cuyahoga R.	1, 055	Secondary	'59, '65	75-85	CI	S	Prep. plans for impvt
Twinsburg	Tinkers Cr.	4, 098	Secondary	'57	80-90	CA	S	

TABLE 2A Continued

Community	Receiving Stream	1960 Population	Type of Treatment	Date Built	% Red. BOD	Status	Type Sewer	Remarks
Major Sewer Districts								
Cuyahoga S.D. 13								
Breckville	Cuyahoga R.	7,282	Secondary	'62	85-90	CA	S	
Cuyahoga S.D. 20								
Walton Hills	Tinkers Cr.	1,776	Secondary	'55	87-95	CA	S	
Summit Co. S.D. 4A								
Stow	Cuyahoga R.	12,194	Primary	'24	40-45	CI	S	To be Trib. to Akron

(1) The facilities of the City of Akron also serve most of the City of Cuyahoga Falls (44,200 persons), approx. 70% of the City of Tallmadge (7,172) and the Villages of Lakemore (2,765), Mogadore (3,851) and Silver Lake (2,655)

(2) The facilities of the Southerly plant of the City of Cleveland also serve the Cities of Beachwood (6,089), Brooklyn (10,733), 84% of Brook Park (10,856), Cleveland Heights (61,813), East Cleveland (37,991), Garfield Heights (38,455), Lyndhurst (16,805), 88% Maple Heights (27,967), Parma (82,845), Parma Heights (18,100), Seven Hills (5,708), Shaker Heights (36,460), South Euclid (27,569), University Heights (16,641), Warrensville Heights (10,609) and the Villages of Bratenahl (1,332), Brooklyn Heights (1,449), Linndale (381), Newburgh Heights (3,512), and North Randall (688)

Legend

CA	Currently Acceptable
CI	Currently Inadequate

TABLE 2B
STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
CUYAHOGA RIVER BASIN

Name	Location	Receiving Stream	Type of Wastes	Type of Treatment	Status	Remarks
Reduction Co., Inc. crods Co. Div.	Cuyahoga Hgts.	Direct			CI	
Alside Homes Corp.	Summit Co. Northampton Twp.	Mud Brook	Sewage only	Aerobic digestion	CA	
The Bailey Wall Paper Company	Cleveland	Big Creek	Organic	None	CI	Planning to connect to municipal sewers
The Burdett Oxygen Co. of Cleveland, Inc.	Cleveland	Direct	Suspended & Dissolved Solids	Lagoons	CA	Sludge hauled away for sale
Busson Bros. Sand & Gravel Co.	Summit Co. Bath Twp.	Yellow Creek	Sand & Gravel Suspended & Dissolved Solids	Lagoon	CA	
Cornwell Quality Tools Company	Mogadore	Outlet of Wingfoot Lake, Lt. Cuyahoga R.	Metal Finish.	Controlled discharge	CA	Small plating room
e Cuyahoga Meat Co.	Cleveland	Big Creek	Meat Packing	Septic Tank	CI	Planning to connect to municipal sewers
E. I. duPont deNemours & Co., Inc., Industrial and Biochemicals Dept.	Cleveland	Direct	Chemical Acids, Metals	Zinc recovery Acid neutralization	CI	Need improvements
The Elco Lubricant Corp.	Cleveland	Direct	Oil Treating	Oil Separations	CA	

TABLE 2B Continued

Name	Location	Receiving Stream	Type of Wastes	Type of Treatment	Status	Remarks
Ferro Chemical Div. of Ferro Corp.	Walton Hills	Ditch Trib. to Tinkers Cr.	Chemical Suspended Solids	Clarification	CA	
Ford Motor Company Engine Plts. #1 & #2	Brook Park	Trib. of Big Cr.	Oils	Oil separation Chemical treatment	CA	
General Chemical Div. Allied Chemical Corp. National Works	Garfield Heights	Mill Cr.	Chemical Acids & Dissolved Solids	Clarification in-plant Control	CA	
Harshaw Chemical Co.	Cleveland	Direct	Metal Salts	In-plant control	CI	Improvements required
Hilltop Sand & Gravel Company	Portage Co. Brimfield Twp.	Trib. to Mogadore Res.	Sand & Gravel Suspended Solids	Lagoons	CA	
Jones & Laughlin Steel Corp.	Cleveland	Direct	Steel-Acid Iron	Controlled discharge	CI	Planning in-plant changes
Jones & Laughlin Steel Corp.	Cleveland	Direct	Steel-Blast Furn. Suspended Solids	Clarification	CA	Additional solids removal require
Jones & Laughlin Steel Corp.	Cleveland	Direct	Steel-Mill Scale Suspended Solids	Clarification	CI	
The Lamson & Sessions Co.	Kent	Direct	Oil	Chemical oil separation	CA	
Master Anodizers & Platers, Inc.	Walton Hills	Trib. of Tinkers Cr.	Metal Finish.	Chrome reduction	CA	Improved control required

TABLE 2B Continued

Name	Location	Receiving Stream	Type of Wastes	Type of Treatment	Status	Remarks
Middlefield Swiss Cheese Co-Op.	Geauga Co. Middlefield Twp.	Underground-Trib. of Cuyahoga R.	Milk Proc.	Land spray disposal	CA	
io Edison Co. rge Plant	Akron	Direct	Suspended Solids	Fly ash lagoon	CA	
Orangeburg Mfg. Co. Div. of The Flintkote Co.	Portage Co. Rootstown Twp.	Breakneck Cr.	Acids, Suspended Solids	Chemical treatment lagoons		CA
Owens-Illinois Forest Prod. Div.	Summit Co. Northfield Twp.	Direct	Paper Mill	Land spray disposal	CA	Require better operation
Republic Steel Corp.						
Bolt & Nut Div.	Cleveland	Direct	Steel-Acid Iron	Controlled discharge	CI	Planning in-plant changes
Cleveland District	Cleveland	Direct	Steel-Acid Iron	Controlled discharge	CI	Planning in-plant changes
Cleveland District	Cleveland	Direct	Steel-Blast Furn. Suspended Solids	Clarification	CI	Improved solids removal required
Plants #1 & #2	Cleveland	Morgana Run, Burke Run	By-Prod. Coke (Phenol)	Dephenolizer Closed quenching	CA	
Bolt & Nut Div.	Cleveland	Direct	Steel-Mill Scale Suspended Solids	Scale pits	CI	Improved solids removal required
Cleveland District	Cleveland	Direct	Steel-Mill Scale Suspended Solids	Scale pits	CI	Improved solids removal required
Research Center	Independence	Unnamed Cr.	Chemicals	Chemical treatment Clarification	CA	

TABLE 2B Continued

Name	Location	Receiving Stream	Type of Wastes	Type of Treatment	Status	Remarks
The Sherwin-Williams Co. Linseed Oil Mill	Cleveland	Direct	Chemical Organic	None	CI	To municipal sewers
allwood Packing ., Inc.	Geauga Co. Middlefield Twp.	Underground Drainage basin of Cuyahoga R.	Meat Packing	Biological treatment	CA	
Sonoco Prod. Co. Ohio Division	Munroe Falls	Direct	Paper Mill	Aeration & clarification	CI	Additional facilities under construction
The Standard Oil Co. No. 1 Refinery	Cleveland	Direct	Oil Refinery	Oil separation & recovery	CI	
The Standard Oil Co. No. 2 Refinery	Cleveland	Kingsbury Run	Oil Refinery	Oil separation & recovery	CA	
U. S. Steel Corp.						
Central Furnaces	Cleveland	Direct	Steel-Blast Furn. Suspended Solids	Clarification	CI	Improved solids removal required
Central Furnaces	Cleveland	Direct	Blast Furnace (Sewage)	None	CI	To connect to municipal sewers
Cuyahoga Works	Cuyahoga Hgts.	Direct	Steel-Acid Iron	Controlled discharge	CI	Planning in-plant changes
Cuyahoga Works	Cuyahoga Hgts.	Direct	Steel-Mill Scale Suspended Solids	Scale pits	CI	Need improvements

TABLE 2B Continued

Name	Location	Receiving Stream	Type of Wastes	Type of Treatment	Status	Remarks
The Walker China Co.	Bedford Hgts.	Tinkers Cr.	Ceramics Suspended Solids	Lagoon	CA	
The S. K. Wellman Co. American Brake Shoe Co.	Bedford	Tinkers Cr.	Metal Finish.	Chemical Treatment	CA	
Zirconium Corp. of America	Solon	Trib. to Tinkers Cr.	Metals, Acids	Chemical Treatment	CA	

Legend	
CA	Currently Acceptable
CI	Currentaly Inadequate

TABLE 3A

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
(MINOR TRIBUTARIES)

(Portage, Sandusky, Huron, Vermillion, Black, Rocky, Chagrin, Grand Rivers, and other Tributaries)

Minor Tributary & Community	Receiving Stream	1960 Population	Type of Treatment	Date Built	% Red. BOD	Status	Type Sewer	Remarks
Portage R.								
Bloomdale	S. Br. Portage R.	669	None	---	---	Pf	---	Lack finances
Bowling Green	Poe Ditch	13,574	Secondary	'35, '39, '62	90-97	CA	S-C	
Elmore	Portage R.	1,302	None	---	---	Pm		Minor pollution
Fostoria	E. Br. Portage R.	15,732	Secondary	'52	85-90	CA	C	
McComb	N. Br. Portage R.	1,176	Primary	'37	15-20	CA	S-C	
N. Baltimore	S. Br. Portage R.	3,011	Secondary	'60	60-80	CA	C	
Oak Harbor	Portage R.	2,903	Primary	'58	30-40	CA	S	
Pemberville	Portage R.	1,237	None		---	CI	---	Gen. plans approved
Port Clinton	Portage R.	6,870	Intermediate	'56	55-60	CA	S-C	
Sandusky R.								
Attica	Honey Cr.	965	None	---	---	CI	---	Engineer hired
Bloomville	Honey Cr.	836	None	---	---	CI	---	Plans needed
Bucyrus	Sandusky R.	12,276	Secondary	'39, '61	90-95	CA	C	
Carey	Tymochtee Cr.	3,722	Secondary	'39, '62	90-95	CA	S	
Crestline	Paramour Cr.	5,521	Secondary	'47	90-95	CA	S-C	
Freemont	Sandusky R.	17,573	Secondary	'49	40-60	CI	C	Impvt. Under Const.
Nevada	Sword Cr.	919	None	---	---	Pm		Minor pollution
Tiffin	Sandusky R.	21,478	Primary	'56	30-35	CI	C	Gen. Plans Sec. Tret. Appvd.
Upper Sandusky	Sandusky R.	4,941	Secondary	'56	60-90	CA	S	

TABLE 3A Continued

Minor Tributary & Community	Receiving Stream	1960 Population	Type of Treatment	Date Built	% Red. BOD	Status	Type Sewer	Remarks
Huron R.								
Huron	Huron R.	5, 197	Intermediate	'64	No data	CA	S-C	
Milan	Trib. of Huron R.	1, 309	Primary	'41, '62	No data	CI	S	Needs new area STP
Monroeville	W. Br. Huron R.	1, 371	Primary	'59	35-40	CA	C	
Norwalk	Rattlesnake Cr.	12, 900	Secondary	'31, '56, '64	87-93	CA	S-C	
Plymouth	Huron R.	1, 822	None	---	---	CI		Under construction
Willard	W. Br. Huron R.	5, 457	Secondary	'63	80-85	CA	S-C	
Vermilion R.								
Greenwich	SW. Br. Vermilion R.	1, 371	Secondary	---	No data	CA	S	
New London	Skellenger Cr.	2, 392	Secondary	'42, '63	80-85	CA	S	
Wakeman	Vermilion R.	728	None	---	---	E	-	No pollution
Vermilion	Vermilion R.	5, 220	Primary	'21	30-35	CA	S	
Black R.								
Avon	French Cr.	6, 002	Secondary	'55	No data	CI	S	Need detail plans
Elyria	Black R.	43, 782	Secondary	'29, '63	75-80	CA	S-C	
Grafton	E. Br. Black R.	1, 683	Secondary	'57	85-90	CA	S	
Lagrange	County Ditch	1, 007	None	---	---	CI	-	Detail plans approved
Lodi	Trib. of Black R.	2, 213	Secondary	'54	85-90	CA	S	Imprvts. U. C.
Lorain (1)	Black R.	68, 932	Primary	'56	50-55	CA	S	

TABLE 3A Continued

Minor Tributary & Community	Receiving Stream	1960 Population	Type of Treatment	Date Built	% Red. BOD	Status	Type Sewer	Remarks
N. Ridgesville	Trib. of French Cr.	8,057	Secondary	'63		CA	S	
Oberlin	Plum Cr.	8,198	Secondary	'56	90-95	CA	S	
Spencer	Spencer Cr.	742	None	---	---	Pmf		Minor poll. lack funds
Wellington	W. Br. Black R.	3,599	Secondary	'39,'59	80-90	CA	S	
Rocky R.								
Berea	E. Br. Rocky R.	16,592	Secondary	'36,'51,'65	90-95	CA	S	
Brook Park	Abram Cr.	12,856	Secondary	'58,'65	65-75	CA	S	Est. 84% Trib. Clevel
Medina	W. Br. Rocky R.	8,235	Secondary	'31,'61	80-90	CA	S	
Middleburgh Heights	Abram Cr.	7,282	Secondary	'50	60-75	CI		Prep. detail plans
North Olmsted	Rocky R.	16,290	Secondary	'61	85-95	CA	S	
Olmsted Falls	Plum Cr.	2,144	None	---	---	CI		Det. plans approved
Parkview	Trib. of Rocky R.	2,018	None	---	---	CI		Trib. N. Olmsted sew.
Strongsville	E & W Br. Rocky R.	8,504	None	---	---	CI	S	Under construction
Chagrin R.								
Aurora	Aurora Br.	4,049	Secondary	'28	25-98	CA	S	
Chagrin Falls	Chagrin R.	3,458	Secondary	'56	90-95	CA	S	
Grand R.								
Chardon	Big Creek	3,154	Secondary	'55	80-90	CA	S	
Fairport Harbor	Grand R.	4,267	Intermediate	'58	30-35*	CA	S	
Grand River	Grand R.	477	None	---	---	CI		Prepare detail plans
Jefferson	Trib. of Mill Cr.	2,116	Secondary	'57	Est. 90	CA	S	
Orwell	Grand R.	819	None	---	---	Pmf		Minor poll. lack funds
Painesville	Grand R.	16,116	Intermediate	'58	30-35*	CA	S	

TABLE 3A Continued

Minor Tributary & Community	Receiving Stream	1960 Population	Type of Treatment	Date Built	% Red. BOD	Status	Type Sewer	Remarks
Other Tributaries								
Amherst	Beaver Cr.	6,750	Secondary	'27,'57	85-95	CA	S	
Bellevue	Underground	8,286	None			CI		Engineer hired
Clyde	Trib. of Sandusky Bay	4,826	Secondary	'55	80-98	CA	S	
Conneaut	Conneaut Cr.	10,557	Intermediate	'57	30-35*	CA	S	
Geneva	Cowels Cr.	5,677	Secondary	'39,'58	70-85	CI	S	Imprvts. U. C.
Genoa	Toussiant Cr.	1,957	Secondary	'64	No data	CA	C	
Green Springs	Trib. of Sandusky Bay	1,262	Primary	'36	Est. 30-35	CA	S	
Sandusky	Sandusky Bay	31,989	Primary	'59	30-35	CA	S-C	Need sewers
Westlake	Porter Cr.	12,906	None			CI		Detail plans approved

* Data for primary treatment. Intermediate treatment data not available

(1) The facilities of the City of Lorain also serve the City of Sheffield Lake (6,884 persons).

Legend

CA	Currently Acceptable
CI	Currently Inadequate
P	Project postponed
m	Minor pollution
f	Lack of finances

TABLE 3B
STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES LAKE ERIE DRAINAGE AREA IN OHIO MINOR TRIBUTARIES

Minor Tributary and Name of Industry	Location	Receiving Stream	Type of Waste	Type of Treatment	Status	Remarks
Portage River						
Brush Beryllium Co.	Ottawa Co. Harris Twp.	Direct	Chemical Dissolved Solids	Clarification Controlled discharge	CA	Monthly ground water analyses
Foster Duck Farm, Inc.	Wood Co. Montgomery Twp.	Underground-S. Branch Portage R.	Poultry Proc. Organic	Land spray and controlled duck pasture	CA	
Gibsonburg Canning Co.	Gibsonburg	Underground-Trib. of Wolf Creek	Tomato Cannery	Land spray	CA	
The Great Atlantic & Pacific Tea Co., Inc. Ann Page Division	Bloomdale	E. L. Stoves Ditch #1184, S. Br. Portage River	Tomato Cannery	Lagoons	CA	
Pemberville Division Hirzel Canning Co.	Pemberville	To underground	Tomato Cannery	Land spray	CA	
The Seneca Wire & Mfg. Co.	Fostoria	E. Br. Portage R. S. Br. Portage R.	Steel-Acid Iron	Neutralization, settling controlled discharge	CA	
Swift & Company	Hancock Co. Washington Twp.	E. Br. Portage R. S. Br. Portage R.	Soybean Mill Chemical	Grease separation	CI	Negotiating for connection to municipal sewers
Wood County Canning Co., Inc.	North Baltimore	Underground-Rocky Ford Cr.	Tomato Cannery	Land spray	CA	

TABLE 3B Continued

Minor Tributary and Name of Industry	Location	Receiving Stream	Type of Waste	Type of Treatment	Status	Remarks
Sandusky River						
Corfman Gravel Co.	Wyandot Co. Eden Twp.	Negro Run	Sand & Gravel Silt	Settling	CA	
H. J. Heinz Co.	Fremont	Underground	Tomato Cannery	Land spray	CA	75% to municipal wastewater plant
Hewitt-Robins, Inc.	Sandusky Co. Sandusky Twp.	Muskellunge Cr.	Rubber Organic	Aerated lagoon	CA	
Northern Ohio Sugar Co.	Fremont	Direct	Beet Sugar	Holding lagoons controlled discharge	CA	Condenser water monitored
The Pennsylvania Railroad Co.	Crestline	Trib's. of Paramour Cr.	Railroad Oil	Oil separators	CA	
The Pioneer Rubber Co., Plant No. 2	Attica	Honey Cr.	Rubber Alcohol	None	CI	Method of treatment under investigation
Huron River						
The Baltimore & Ohio Railroad Co.	Willard	Drainage Ditch, W. Branch of Huron R.	Railroad Oil	Oil separators	CI	Additional maintenance needed
E. I. duPont deNemours & Co., Inc.	Erie Co. Huron Twp.	Trib. of Huron R.	Chemical, Acids Suspended Solids	Settling lagoon, in-plant controls	CA	
Johns-Manville Products Corp.	Erie Co. Milan Twp.	Mud Cr.	Paper Mill	Complete containment & recirculation of wastes (lagoons)	CA	

TABLE 3B Continued

Minor Tributary and Name of Industry	Location	Receiving Stream	Type of Waste	Type of Treatment	Status	Remarks
Black River						
Baldwin Producing Corp.	Medina Co. Chatham Twp.	Trib. of E. Fk. of of E. Br.of Black R.	Oil, Brine	Reinjection of brine	CA	
Berea Oil Corp.	Medina Co. Chatham Twp	Small Cr. trib. of Black R.	Oil, Brine	Reinjection of brine	CA	
Chatham Operating Company	Medina Co. Chatham Twp.	Trib. of Black R.	Oil, Brine	Reinjection of brine	CA	
Dymo Oil Corp.	Medina Co. Chatham Twp.	E. Branch of Black R.	Oil, Brine	Reinjection of brine	CA	
Carter M. Hanna	Medina Co. Chatham Twp.	Trib. of E. Br. of Black R.	Oil, Brine	Reinjection of brine	CA	
The Preston Oil Company	Medina Co. Chatham Twp.	Small ditch Trib. to E. Br. of Black R.	Oil, Brine	Controlled injection of brine	CA	
Republic Steel Corp. Steel & Tubes Div.	Elyria	Direct	Steel-Acid Iron	Controlled discharge after settling	CA	
Republic Steel Corp. Steel & Tubes Div.	Elyria	Direct	Steel-Mill Scale Suspended Solids	Settling	CA	
Ternstedt Div. General Motors Corp.	Elyria	W. Br. of Black R.	Metal Finishing	Cyanide oxidation chrome reduction settling	CI	Plans being prepared
The United Dairy Co.	Lodi	Underground	Milk Processing	Land spray	CA	

TABLE 3B Continued

Minor Tributary and Name of Industry	Location	Receiving Stream	Type of Waste	Type of Treatment	Status	Remarks
Black River continued						
U. S. Steel Corp. Tubular Operations	Lorain	Direct	Steel-Acid Iron	Neutralization and settling	CA	
U. S. Steel Corp. Tubular Operations	Lorain	Direct	Steel-Blast Furn. Suspended Solids	Clarification	CA	
U. S. Steel Corp. Tubular Operations	Lorain	Direct	Steel-Mill Scale Suspended Solids	Scale pits	CA	
U. S. Steel Corp.	Lorain	Direct	Phenol	Dephenolizer	CA	
Rocky River						
Astoria Plating Corp.	Parma Hgts.	Trib. of Rocky R.	Metal Finishing	Cyanide oxidation chrome reduction	CA	
Chrysler Corp. Defense Operations Div.	Brook Park	Abram Cr.	Metal Finishing	Cyanide oxidation chrome reduction	CA	
Chagrin River						
Chase Bag Co.	Chagrin Falls	Direct	Paper Mill	Filtration for removal of solids	CA	Partial discharge to municipal sewers
General Biochemicals, Inc.	Geauga Co. Bainbridge Twp.	Ditch Trib. of Chagrin R.	Chemical Organic	Neutralization, settling monitored - discharge	CA	
Moss Farm Dairy, Inc.	Geauga Co. Chester Twp.	Griswold Cr.	Milk Proc.	Sand filters	CA	

TABLE 3B Continued

Minor Tributary and Name of Industry	Location	Receiving Stream	Type of Waste	Type of Treatment	Status	Remarks
hagrin River continued						
Mulberry Sand & Gravel Co.	Geauga Co. Chester Twp.	E. Br. of Chagrin R.	Sand & Gravel Suspended Solids	Settling	CA	
Pennsylvania Glass Sand Corp., Industrial Silica Division (Geauga Plant)	Portage Co. Aurora Twp.	Small trib. of Chagrin R.	Sand & Gravel Suspended Solids	Settling	CA	
Grand River						
Calhio Chemicals, Inc.	Lake Co. Perry Twp.	Red Cr.	Chemical Suspended & Dissolved Solids	Neutralization, settling controlled discharge	CA	
Chardon Rubber Co. Div. of Ball Bros. Co. Inc.	Chardon	Trib. of Big Cr.	Rubber Mfg. Oil, Solids	Primary discharge to Chardon STP, significance of remaining wastes under evaluation	CA	
Diamond Alkali Co.	Fairport	Direct	Chemical Suspended & Dissolved Solids	Settling, neutralization reduction - controlled discharge	CI	Plans for correction in preparation
The Metal Craft Co.	Chardon	Trib. of Big Cr.	Metal Finish.	Controlled discharge	CA	Minor operation
Naugatuck Chemical Div. of U. S. Rubber Co.	Lake Co. Painesville Twp.	Direct	Chemical Suspended & Dissolved Solids	Settling - lagoons	CI	Planning corrective measures

TABLE 3B Continued

Minor Tributary and Name of Industry	Location	Receiving Stream	Type of Waste	Type of Treatment	Status	Remarks
Grand River continued						
A. E. Staley Mfg. Co.	Grand River	Direct	Chemical Soy Bean Prod.	Lagoon	CI	Negotiating for discharge to municipal sewer
Welded Tubes Inc.	Ashtabula Co. Orwell Twp.	Ditch trib. to	Sewage only	Septic tank	CA	
Ashtabula River						
Cabot Titania Corp. Titanium Dioxide Plt. *	Ashtabula Co. Ashtabula Twp.	Field Brook	Chemical Suspended Solids	Settling basins		Status questionable, interaction of waste in stream under study
Cabot Titania Corp. Titanium Tetrachloride Unit*	Ashtabula Co. Ashtabula Twp.	Field Brook	Chemical Suspended Solids	Lagoons		Status questionable, interaction of waste in stream under study
Detrex Chemical Ind., Inc., Chlorinated Solvents Div. *	Ashtabula Co. Ashtabula Twp.	Field Brook	Chemical Hydrocarbons	Lagoons, settling neutralization	CA	
Diamond Alkali Co. Semi-Works	Ashtabula Co. Ashtabula Twp.	Trib. of Ashtabula R.	Chemical, Acids Suspended Solids	Neutralization, settling incineration	CA	
The General Tire & Rubber Co., Chem. Div. *	Ashtabula Co. Ashtabula Twp.	Field Brook	Chemical Solids	Chemical treatment settling	CA	
Olin Mathieson Chem. Corp. TDI Facility*	Ashtabula Co. Ashtabula Twp.	Field Brook	Chemical Solids	Lagoons	CI	Improvements under study

TABLE 3B Continued

Minor Tributary and Name of Industry	Location	Receiving Stream	Type of Waste	Type of Treatment	Status	Remarks
Ashtabula River continued						
Reactive Metals, Inc. Extrusion Plant	Ashtabula Co. Ashtabula Twp.	Field Brook	Metal Fabric	Chemical Treatment Filtration	CA	Radioactive checks to meet AEC requirements
Reactive Metals, Inc. Metals Reducation Plt. *	Ashtabula Co. Ashtabula Twp.	Field Brook	Chemical Acids, Solids	Neutralization settling	CA	
Reactive Metals, Inc. Sodium & Chlorine Plt. *	Ashtabula Co. Ashtabula Twp.	Field Brook	Chemical Suspended & Dissolved Solids	Settling ponds	CA	
Other Tributaries						
Bechtel-McLaughlin Inc.	Erie Co. Perkins Twp.	Pipe Cr.	Metal Finishing	Cyanide oxidation	CI	Need treatment for chrome, acids and alkalies
The Cleveland Electric Illuminating Co. South Ridge Warehouse	Ashtabula Co. Saybrook Twp.	E. Br. Redbrook Cr.	Sewage only	Lagoon	CA	
Detrex Chemical Ind., Inc. Chlorine-Alkali Plant	Ashtabula Co. Ashtabula Twp.	Trib. of Lake Erie	Chemical Inorganic	Neutralization Controlled discharge	CA	
Doehler-Jarvis Div. National Lead Co. Toledo Plant #2	Lucas Co. Washington Twp.	Shantee Cr.	Metal Finishing	In-plant controls & recovery	CA	Planning new waste treatment facilities

TABLE 3B Continued

Minor Tributary Name of Industry	Location	Receiving Stream	Type of Waste	Type of Treatment	Status	Remarks
Ford Motor Company						
Lorain Assembly Plant	Lorain Co. Brownhelm Twp.	Quarry Cr.	Metal Finishing	Chemical treatment & lagoons	CA	
Sandusky Hardware Plant	Erie Co. Margaretta Twp.	Mills Cr., Sandusky Bay	Metal Finishing	Cyanide oxidation chrome reduction lagoons	CA	
General Electric Co. Bellevue Lamp Plant #242	Bellevue	Underground - Lake Erie	Sewage only	Septic tank	CI	To underground will connect to municipal sewers when available
Hirzel Canning Co.	Wood Co. Ross Twp.	Underground - Wolf Cr.	Tomato-Beet Cannery	Land spray	CA	
The Lake Erie Canning Company	Erie Co. Perkins Twp.	Pipe Cr., Sandusky Bay	Cannery Tomato, Kraut, Cherry	Lagoon	CA	
Libbey-Owens-Ford Glass Co. East Toledo Plant	Wood Co. Ross Twp.	Otter Cr., Maumee Bay	Glass Mfg.	Lagoons	CA	
Natl. Aeron. & Space Admin. Plum Brook	Erie Co. Perkins Twp.	Plum Br., Sandusky Bay	Research	In-plant control	CA	Radioactivity checks to meet AEC requirements

TABLE 3B Continued

Minor Tributary and Name of Industry	Location	Receiving Stream	Type of Waste	Type of Treatment	Status	Remarks
Natl. Aeron. & Space Admin. Plum Brook Sta. (Research Center)	Erie Co. Perkins Twp.	Plum Brook	Sewage only	Complete	CA	
New Departure Div., GMC	Erie Co. Perkins Twp.	Mills Cr., Sandusky Bay	Metal Finishing	Chrome reduction & Settling	CA	
Painesville Laundry & Dry Cleaning Co.	Lake Co. Painesville Twp.	Barton Ditch	Laundry Organic	Sand filter	CI	Negotiating for discharge to municipal sewers
Rockwell-Standard Corp. Brake Division	Ashtabula Co. Saybrook Twp.	Trib. of Red Brook	Metal Finishing	Cyanide oxidation	CA	
Silver Fleece, Inc.	Sandusky Co. Riley Twp.	South Cr., Sandusky Bay	Kraut Cannery	Lagoon - controlled discharge	CI	Additional facilities under construction
The Standard Oil Co. Toledo Refinery	Oregon	Otter Cr., Maumee Bay	Oils	Oil separators lagoons	CA	
Stokely-Van Camp., Inc.	Ottawa Co. Allen Twp.	Cedar Cr.	Tomato Cannery	Land spray	CA	
* Sun Oil Company Toledo Refinery	Oregon	Otter Cr., Maumee Bay	Oils	Oil separators lagoons Biological treatment for phenols & organics	CA	
The Toledo Edison Co. Bay Shore Station	Oregon	Driftmeyer Ditch, Maumee Bay	Suspended Solids	Lagoons	CA	

* Unique application of recirculation in a cooling tower for biological treatment for removal of phenols & organics. High degree of removal obtained.

TABLE 3B Continued

Minor Tributary and Name of Industry	Location	Receiving Stream	Type of Waste	Type of Treatment	Status	Remarks
Toledo Scale Div. of Toledo Scale Corp.	Lucas Co. Washington Twp.	Shantee Cr.	Metal Finishing	Settling and controlled discharge	CA	
True Temper Corp.	Geneva	Cowles Cr.	Metal Finishing	Chrome reduction cyanide oxidation	CI	Plans for improvements under study
True Temper Corp. Saybrook Plant	Ashtabula Co. Saybrook Twp.	Trib. of Red Brook	Metal Finishing Sewage	Aerobic digestion	CA	
Union Carbide Corp. Linde Division Welding Materials Plant	Ashtabula Co. Ashtabula Twp.	Trib. of Lake Erie	Steel-Acid Iron	Lagoons	CA	
Whirlpool Corp. Clyde Division	Clyde	Raccoon Cr., Sandusky Bay	Metal Finishing	Cyanide oxidation settling	CA	

Legend

CA	Currently Acceptable
CI	Currently Inadequate
*	Cooperative study on stream conditions underway

TABLE 4A

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES LAKE ERIE DRAINAGE AREA IN OHIO (LAKE SHORELINE)

Community	1960 Population	Type of Treatment	Date Built	% Red. BOD	Status	Type Sewer	Remarks
Cities							
Ashtabula (1)	24,559	Intermediate & Cl_2	'55	30-35*	CA	S	
Avon Lake	9,403	Intermediate & Cl_2	'61	15-30*	CA	C	
Cleveland							
Westerly Plant	242,050	Primary & Cl_2	'22, '57	20-35	CI	S-C	
Easterly Plant	389,000	Secondary & Cl_2	'38	80-90	CA	S-C	
Euclid (2)	62,998	Intermediate & Cl_2	'60	40-55*	CA	S	
Lakewood	66,154	Primary & Cl_2	'39, '65	10-30	CI	S-C	Secondary plt. U. C.
Willoughby- Eastlake (3)	27,525	Intermediate & Cl_2	'61	35-50*	CA	S	
Villages							
Geneva on the Lake	631	Primary & Cl_2	'28	No data	CA	S	
Harbor View	273	None	---	---	---	-	Include in Oregon plan
Put-in-Bay	357	None	---	---	---	-	
Vermilion on the Lake	1,273	Primary & Cl_2	'57	20-45	CA	S	Now part of Vermilion
Cuyahoga Co. S. D. #6 Rocky River (4)	18,097	Intermediate & Cl_2	'62	10-45*	CA	S	

TABLE 4A Continued

Legend

CA	Currently Acceptable
CI	Currently Inadequate
*	Data for primary treatment. Intermediate treatment data not available
(1)	The facilities of the City of Ashtabula also serve East Ashtabula (4, 179 persons)
(2)	The facilities of the City of Euclid also serve Highland Heights (2, 929), Richmond Heights (5, 068), Wickliffe (15, 760) and Willowick (18, 749)
(3)	The facilities of Willoughby-Eastlake also serve Timberlake (670)
(4)	The facilities of Cuyahoga County SD#6 also serve Bay (14, 489) and Fairview Park (12, 300)
(5)	The facilities of the Easterly plant of Cleveland also serve Beachwood (6, 089), Bratenahl (1, 332), Cleveland Heights (61, 813), East Cleveland (37, 991), Mayfield Heights (13, 478), Shaker Heights (36, 460), South Euclid (27, 569)

TABLE 4B
STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES LAKE ERIE DRAINAGE AREA IN OHIO
LAKE SHORELINE

Name	Location	Type of Wastes	Type of Treatment	Status	Remarks
Aluminum & Magnesium Inc.	Sandusky	Chemical	Lagoon	CA	
The Cleveland Electric Illuminating Company					
Ashtabula Plant	Ashtabula Co. Ashtabula Twp.	Suspended Solids	Lagoons	CA	
Avon Plant	Avon Lake	Suspended Solids	Lagoons	CA	
Eastlake Gen. Sta.	Eastlake	Suspended Solids	Lagoons	CI	Improvements needed
IRC Fibers Division Midland-Ross Corp.	Lake Co. Painesville Twp.	Suspended Solids Zinc, Organics	Lagoons	CI	
The Lubrizol Corp.	Wickliffe	Chemical	Chemical & Biological Oil Removal	CA	
Ohio Edison Company Edgewater Plant	Lorain	Suspended Solids	Lagoons	CA	
Thompson Ramo Wooldridge, Inc.	Euclid	Metal Finishing	Settling tanks	CI	Improvements needed
Union Carbide Corp. Metals Division	Ashtabula Co. Ashtabula Twp.	Steel-Misc. Acids, Suspended Solids	Neutralization and Clarification	CA	
United States Gypsum Company	Ottawa Co. Portage Twp.	Paper Mill	Clarification and in-plant reuse	CA	

I would like to call attention, in conclusion, that some of the tables appended to this report are not strictly 100 per cent up to date, and if there are some errors noted, we would appreciate your calling them to our attention, but we don't feel that there are any large errors of such magnitude to cause too much concern.

Thank you very much.

(Applause.)

MR. STEIN: Thank you, Mr. Eagle.

Are there any comments or questions?

MR. POSTON: I have some, Mr. Chairman.

MR. STEIN: Go right ahead.

MR. POSTON: Mr. Eagle, I noticed a couple of statements from industries in the back of your report here. Will we hear from some of the industries themselves?

MR. EAGLE: Yes, I believe so.

MR. POSTON: For example, I see Appendix A, Republic Steel Corporation. Will they be heard from?

MR. EAGLE: I believe they have so requested, yes, sir.

MR. POSTON: All right. I was particularly interested to determine whether or not they will have information on their effluent that they would be willing to divulge to the conferees.

I suppose it would be appropriate to ask them?

MR. EAGLE: I would think so.

MR. POSTON: I would like to explore a little bit into your feelings relative to the adequacy of your program to cope with the problems at Racine and the Cuyahoga River, and the problems as you have outlined them with industrial pollution and municipal pollution in this Lake Erie Basin, and I wonder whether you feel that you have an adequate program and ample funds to carry out the type of a program you think is required to handle these situations?

MR. EAGLE: Well, could you be a little more explicit as to what you particularly saw that should be corrected?

MR. POSTON: I am thinking in terms of a water pollution program that would check up on municipal plants -- maybe that you deem necessary -- so that you will get good operation, and so that you will know when the capacities of these plants are being exceeded.

I don't know exactly in your particular case, but, in general, State agencies have a plan in which they carry out inspection activities, they carry out plan reviews, they carry out enforcement actions, technical assistance, and this comprises a total water pollution program for an area, so that you keep up with the needs in this water quality.

I wonder whether or not you feel you have money and personnel enough to carry out an adequate program?

MR. EAGLE: Well, this would be a relative question, I would say.

We are doing all those things that you have mentioned -- making inspections, approving plans, carrying out enforcement actions, and all that sort of thing.

Of course, with the magnitude of this problem, we never have enough people to do all the things we would like to do.

I would say that we are doing a reasonably adequate program. This is not to say that we couldn't do more, but by comparison with other states -- and certainly not in comparison with the Public Health Service, because we can't compare with them in staff and facilities -- but I would say that we had a reasonably adequate program.

MR. STEIN: Compared to what state do you have a reasonably adequate program? Would you care to mention it?

MR. EAGLE: All of our sister states.

MR. STEIN: Comparable to what? Do you think your program is comparable to Indiana and Michigan?

MR. EAGLE: He asked me as to staff adequacy, which I think is the question. At least, that is the way I interpreted his question, the adequacy of our staff. That is the way I understood the question.

MR. POSTON: No. I think you have some very capable people in your staff.

My concern is, do you have enough to do the job that is required, and you feel is required to keep pollution minimized in this area?

MR. EAGLE: Well, I will go back and qualify my answer again, like I did before.

Very rarely in any program do we have enough staff to do all of the things that we would like to do. Certainly, we could use more staff and we could perhaps generate some more activity in the way of corrective devices in installations.

I don't think that there is a state administrator in the United States who wouldn't agree to this.

MR. POSTON: Well, it is my general feeling, and I just wanted to bring out that you can't get blood out of a turnip, that what is required is people to do this job. The people want it done.

I wondered if, in your budget preparations, if you didn't ask for more money, if you get turned down, what is this situation?

I realize this is a touchy matter with you, but I think that it has a very important bearing on this overall problem, in that you can't be expected to do this thing unless you have funds for it.

MR. EAGLE: Well, you are getting out of the realm of things over which I have control.

MR. POSTON: Yes.

MR. EAGLE: I hope you didn't mean to infer that we were turnips.

(Laughter.)

MR. STEIN: We didn't mean to infer that this was going to be bloody, either.

(Laughter.)

MR. POSTON: I noted over in the Maumee Basin that we have 90 to 95 per cent treatment, and that we still have low dissolved oxygen.

It is my understanding that industrial wastes have caused fish kills over in that area, and I wondered if this couldn't have been part of the reason for the low dissolved oxygen content?

MR. EAGLE: Yes, sir. In a part of the basin, this was a part of the problem, from industrial waste discharges.

Extensive facilities are now under construction. We hope that this will be alleviated to a considerable extent.

But I would like to point out that because of the extremely low flows in this area, flat topography and terrain, and the fertile runoff that we get during the summer months, this all adds to this problem considerably.

As pointed out in your report, Mr. Poston, I think that this is going to be a combined matter of more treatment, better operated treatment plants, and some low flow augmentation. This seems to me like it is going to be a necessity in this area.

MR. POSTON: I noted on Page 16 of your report something to the effect that the Public Health Service hadn't agreed to a cooperative effort, that we haven't given approval of this.

I wondered if this matter were not still under negotiation with you.

MR. EAGLE: No. This program -- I didn't read that part of the report, but it is in the report.

MR. POSTON: Yes.

MR. EAGLE: No. This program is under way, and will be in full force the latter part of this month. Some very extensive sampling will be undertaken. We are attempting to work this out with your staff here in Lake Erie.

MR. POSTON: Yes.

MR. EAGLE: But if this can't be worked out, it will still go ahead.

MR. POSTON: Well, it is under negotiation?

MR. EAGLE: Yes, sir.

MR. POSTON: That was the point.

Do you have any idea of the time required to provide secondary treatment for the Lake Erie Basin? Would this be a year or two years, or what would be a reasonable time?

MR. EAGLE: Well, I certainly wouldn't think a year would be a reasonable time, and two years would be cutting it awfully fine. I think to complete this job, it would be something more in the neighborhood of five years.

MR. POSTON: I think that is all I have right now.

MR. STEIN: Are there any further questions?

MR. POOLE: In your discussion of the Maumee, Mr. Eagle, on Page 5 you make the statement that boating and water skiing is carried out in a few stretches of the Maumee.

Can you give me an indication of where those are, as to location?

MR. EAGLE: In the lower stretches of the river, near Toledo, and -- I will have to check this -- I believe some stretches below Defiance. In Defiance and Napoleon, and downstream from Napoleon towards Toledo.

MR. POOLE: Thank you.

MR. STEIN: You know, this is the amazing part of this. In reading the Public Health Service report and reading this report, describing the same rivers, I am reminded of a wake. You look in the coffin to see if that is the man that you are describing.

You talk about Napoleon, Ohio, where the Public Health Service report indicates that the discharge in Napoleon, Ohio originates from two major sources, with the Campbell Soup Company discharging 4,620 pounds of BOD and 268 pounds of oil a day.

Now, they do do the swimming there, or the boating. The point is again, and this applies throughout the report, in spite of limitations, you are always speaking about the bright side. You say that the streams provide good fishing.

You talk about the Auglaize River without any qualification. Then, lo and behold, on Page 60 of the Public Health Service report, it says:

> "The Auglaize River above Wapakoneta supports a well-balanced biological population at all seasons of the year. Pollution-sensitive species of mayflies, caddis flies, and scuds were common. Below the town, the water quality is severely degraded. Although bottom fauna of pollution-sensitive mayflies, caddis flies, and dragon flies were found to be fairly numerous in the spring of 1964, by July all pollution-sensitive organisms had been eliminated and only sludgeworms and midge larvae remained. The stream bottom which had been scoured clean of silt and organic deposits during the spring was covered with black, septic, malodorous sludge by July."

Now, we had these aquatic biologists here. I would suggest that we do not, on the basis of the report, say that the Auglaize River provides good fishing. I wouldn't go indiscriminately up and down the Auglaize at any time of the year and attempt to drop my hook in the water and expect to have much action.

In the same way, you say sport fishing is carried on in some reaches of the Sandusky River, the Rocky River, and the Black River. That may be true, but it is a question of what you emphasize.

The Public Health Report says that sewage pollution, as indicated by the total coliform count, is prevalent throughout the basin. It says:

> "The Sandusky River had a median coliform density of 190,000 organisms per 100 ml below Fremont for the months of October and November, 1964. In Sandusky Bay at the mouth of the river, the median coliform density was less than 1,000 organisms per 100 ml, with a high of 1,300 organisms per 100 ml.
>
> "Median coliform density in the Black River below the Elyria treatment plant was 300,000 organisms per 100 ml during the first three months of the year. During April and May, the median density was

140,000 organisms per 100 ml and the median fecal coliform density was 57,000 organisms per 100 ml."

In the description of the Rocky River in the Federal report, they state:

"Debris and floating fecal solids have been observed at numerous locations. During the summer, the water is a deep green color due to algal blooms. The lower 15 miles of the stream often reek with a characteristic septic sewage odor, during periods of low flow."

Now, I assume that both reports describe different aspects of the situation, but I guess we are dealing with the pollution situation.

MR. EAGLE: I think we are describing different stretches of the stream.

MR. STEIN: I guess.

(Laughter.)

MR. STEIN: But how come those stretches weren't really described in your report? The good fishing ones seem to have been recognized.

MR. EAGLE: Well, I think it is very definitely pointed out here the remaining problems in many of these areas, where we have low DO, we have algal problems, and we have gross pollution problems.

MR. STEIN: There was one thing that I found missing. You enumerated several industries. I wonder -- maybe your tables do it in the back of the report.

MR. EAGLE: They are 100 per cent in the tables. Every one is in there.

MR. STEIN: All the industries are in the tables?

MR. EAGLE: Yes.

MR. STEIN: When you say 4 industries or 9 industries, we will be able to find those names in the table?

MR. EAGLE: Yes, sir.

MR. STEIN: We will be able to find out what they are putting in now that you consider inadequate, so a judgment can be made with reference to that?

MR. EAGLE: Yes, sir.

MR. STEIN: In other words, we will get the effluent data to figure out what you consider inadequate?

MR. EAGLE: I didn't say that.

MR. STEIN: Well, that is the question.

MR. EAGLE: I said that is the industrial wastes that are being discharged.

MR. STEIN: How can we know?

Again, the Governor asked us in again for full cooperation. If you term they are not putting in adequate treatment, how will we be able to make a judgment as to whether they are putting in adequate treatment, other than by examining your tables, unless we have the specifics of the amounts, so that we and the other states, the public and the newspapers can get together, see how they have corrected it, and see if the job is done?

You are asking us to do these fancy studies. Maybe we can figure out a method on how to do that too.

MR. EAGLE: Mr. Stein, as I told Mr. Poston two or three weeks ago, if you tell us exactly what it is that you want, we will certainly do everything in our power to try to get it for you.

MR. STEIN: We have heard this talk about the comparable programs that you had with your sister states. We have heard Perry Miller from Indiana, we have heard Mr. Purdy from Michigan, and you heard what they said about their industries. You can read the transcripts of the other conferences that we have had with them.

I would imagine that precisely the kind of information on each industry that Perry Miller gave us earlier today is what we want.

We have all been in this field for a long time, and there is no mystery as to what the professional people in the field require of each other in order to make a judgment.

I don't want to praise Mr. Miller too much. In my opinion, he is one of the best industrial waste experts in the country. But I think in this area of professional communication, Mr. Miller and Mr. Poole knew exactly what the other conferees wanted, in my opinion, and they came up with it.

I know Mr. Poston, and I suspect he is not bashful. I have been in touch with Mr. Poston. He told me he has asked you that repeatedly, and hasn't been able to get it.

MR. EAGLE: Well, that's a long story. I don't know whether you want to go into it here or not, but we have had considerable correspondence and discussion, back and forth.

MR. STEIN: In other words, if Mr. Poston asks for it now, he can get this information?

MR. EAGLE: I said I would do everything that I could to get it for him. You realize what our problem is.

MR. STEIN: I recognize this.

You know, I work with Peter Kuh, who grew up in Chicago, and Peter Kuh says that whenever you went to one of the local politicians -- and I say this with the greatest respect for the Chicago man, because I know him -- and you asked him a question, the stock answer when they didn't want to do anything was, "Son, I'll do everything I can to help you."

I hope we will get this information so we can all make this judgment.

Now, again, I would like to refer to this, and you or Dr. Arnold perhaps want to answer this. At the Detroit meeting of the governors, our notes indicate that your Governor indicated that this problem was too large for one state, and he wanted the Federal Government to come in. He said, "Lake Erie and the problems of Lake Erie have been studied more than any other subject but the Bible." He said, "What we don't need is more meetings, more symposiums, and more studies, and we must do everything possible toward accelerated action."

It seems to me that I didn't see this in your report. You have urged us to take on the broader problems, and this is in Dr. Arnold's statement, and you say, "We know what to do about our internal or lakeshore problems in Ohio, and are doing it."

Now, your Governor asked us in here on an intrastate problem, as well as an interstate problem. I assume your statement is correct, because otherwise you wouldn't have taken us up to the Cuyahoga River and showed us that you know what to do about your problems and you are really doing it.

The floor is open.

MR. EAGLE: Dr. Arnold, do you want to speak to that or not?

DR. ARNOLD: Well, Mr. Stein, I think you are pursuing this questioning a little vigorously.

As you know, the problem in Ohio and under the Ohio law, on some of the information that you wish to have, we cannot make it available to you even if we had it.

MR. STEIN: Let's get to a resolution of this, because I recognize what the Ohio law is, and I am fully sympathetic with your problems.

As I understand the Ohio law, that information can be made available to us, without any question, if the industries give us permission.

Now, I don't know that industry has been asked to give its permission, or that correspondence has gone back and forth without industry being asked.

Obviously, as you know, in a Federal-State relations operation, we try -- and goodness knows we try, and we have people from the other states here who can testify to this -- we try not to go directly to your industries from the Federal Government, if we can possibly help it. We try to maintain Federal-industrial relationships.

But if the question arises here that you have to ask industry's permission, and you don't ask it, then we have this problem of Federal-State relations, of our dealing directly with the industries.

I really do think, Doctor, that this is an awkward situation and that some resolution should be attempted to resolve it.

DR. ARNOLD: I don't know the answer to it right now, Mr. Stein.

MR. STEIN: All right, but I think we do recognize the problem.

DR. ARNOLD: There is some indication that this policy by industries may be relaxed somewhat. I think that there is a definite indication that this information probably will be made available.

I can't promise you 100 per cent of the industries in Ohio, but I think a large number of them will make this information available to you.

MR. STEIN: Well, thank you. That is very encouraging, Doctor.

Are there any further comments?

(No response.)

MR. STEIN: If not, do you want to proceed further, Doctor, or do you want to adjourn?

DR. ARNOLD: I think, if you will allow us to please proceed with the reports --

MR. STEIN: Yes, of course.

DR. ARNOLD: Next, we would like to introduce Mr. Morr, Director of the Department of Natural Resources, and a member of the Ohio Water Pollution Control Board.

Mr. Morr.

STATEMENT OF
FRED E. MORR, CONFEREE
AND DIRECTOR OF NATURAL RESOURCES,
STATE OF OHIO

MR. MORR: Mr. Chairman, to avoid repetition and to conserve time, I shall brief my prepared statement and request inclusion in the record of all the material.

My name is Fred E. Morr. I am Director of Natural Resources for the State of Ohio. My concern is the protection and wise use of Lake Erie water as a resource.

Human wastes are the toll of advancing civilization. Every item and substance of human and machine discard litter our beaches, fill our rivers and enrich the depths of Lake Erie. Unsightly objects that resist degradation drift aimlessly and are brought to rest on our beaches by each wave. The "untreated percentage" of our sewage daily finds its way into the Lake.

Yes, Lake Erie is polluted! Some beaches have been closed. Certain species of fish are gone. The water in many areas is unsightly as masses of dead algae float ashore.

There are exceptions: The beaches at East Harbor and Cedar Point are among the finest, and cleanest, in the world. Smallmouth and white bass fishing is superb in the island area. The water quality at municipal intakes is good.

Why are we concerned about Lake Erie? Lake Erie _is_ the most valuable resource in Ohio's water estate. It is situated where coal and iron ore meet to form the nucleus of America's steel industry. Other industries have located here because of transportation, raw materials, labor and technology. The nation's most productive agricultural region is situated in the basin of this water wonderland. Railroads, highways and international ports unite at her shores to form the transportation hub of America.

Let us explore this valuable area in more detail. The land surface of Ohio draining into Lake Erie is only 30 per cent of the State's area, yet it contains over 40 per cent of the State's population. The Ohio drainage area of 11,780 square miles contributes an average annual flow of 10,800 cubic feet per second into Lake Erie. Canada contributes an annual average flow of 5,020 cubic feet per second directly into Lake Erie. The inflow from the Detroit River, representing the outflow of the upper Great Lakes, contributes a huge 173,000 cubic feet per second into Lake Erie, or eleven times the combined flow from the United States and Canada.

The water surface area of Lake Erie is 9,940 square miles of which 4,990 square miles are in the United States. The major part of the United States area, 3,540 square miles, or 71 per cent, is part of Ohio and the ownership of the land underneath the water belongs to the State.

Lake Erie has an amazing storage of water. If the Lake were drained it would require two and a half years to refill from stream flow and the inflow from the upper Great Lakes.

Throughout history, dating from early exploration and settlement of America, Lake Erie has formed a part of a navigable water system of tremendous social and economic importance. More shipping traverses the Lake than passes through the Panama Canal. Ships from all parts of the world call at Lake Erie ports by way of the St. Lawrence Seaway.

The waters of Lake Erie are an indispensable part of Ohio's economy. Nearly 25 per cent of Ohio's huge industrial and domestic use of water is from Lake Erie. It will play an increasingly important part in Ohio's future.

The shores of Lake Erie are the greatest water recreational asset of the State. Ohio has a large investment in recreation on Lake Erie now. Governor Rhode's $100 million, six-year capital plan, will bring additional major recreational facilities along her shores.

Yes, Lake Erie is a valuable resource. Its water must serve all legitimate uses. One use should not negate, nor significantly detract from the others. WHEREVER POLLUTION EXISTS IT MUST BE CORRECTED.

This first conference on pollution of Lake Erie can be a milestone to unified action. States are making progress through their pollution control agencies, but the problem has interstate and international dimensions. This conference can serve to unite the vast research, study and financing capabilities of the Federal Government, the collective efforts of the States through the Great Lakes Commission, renewed local efforts, and informed public support.

It is obvious that additional questions must be answered. Water quality standards and criteria should be more clearly defined. Meanwhile, the obvious sources of pollution must be corrected. Who is to blame? Municipalities, agriculture, industry, household septic tanks, and individual litterbugs all contribute in some part. It is a collective problem.

We must exercise great care to not mislead people as to the COST of pollution abatement measures. To clean up Lake Erie alone, in terms of measures discussed at this conference, could easily cost some THREE TO FOUR BILLION DOLLARS. This includes separation of storm and sanitary sewers, secondary treatment plants, and industrial improvements. It does not include yet undescribed measures to curtail nutrient, silt and pesticide pollution from agricultural lands.

Disposal of waste is a COST OF LIVING, A COST OF EXISTING HEALTHFULLY AND ENJOYABLY which all citizens must bear in some form -- sewer rates, taxes, consumer prices.

The time for nose holding and finger pointing is past. From this conference we must describe our objectives and move jointly with solutions, each agency and each person assuming their appropriate responsibility.

Thank you.

(Applause.)

MR. STEIN: Thank you. Are there any comments or questions?

(No response.)

MR. STEIN: If not, would you go on, Dr. Arnold?

DR. ARNOLD: Mr. Stein, I would like now to allow Toledo the privilege of making their presentation, and this will be made by Mr. Donald J. Yark, Director of the Department of Public Utilities.

STATEMENT OF
DONALD J. YARK, DIRECTOR,
DEPARTMENT OF PUBLIC UTILITIES,
TOLEDO, OHIO

MR. YARK: I am Donald J. Yark, Director, Department of Public Utilities, City of Toledo.

Mr. Chairman, Conferees, Ladies and Gentlemen:

I would like to insert as a matter of record a tabulation of the past 20 years of the City of Toledo Water Department, relative to some parameters of pollution. With your permission, gentlemen, I should like to submit this.

This covers chlorides, coliform, raw plate count, nitrates, and phosphorus chemicals.

MR. STEIN: Are you going to read that into the record, or just submit it?

MR. YARK: No. I would like to submit this, if it is permissible.

MR. STEIN: Without objection, this will be done.

Is this raw or finished water?

MR. YARK: This is raw water that we start out with, and finished water when we get it into our sewer system.

MR. STEIN: I hope so. That issue was raised by Mr. Oeming.

Do your figures pertain to raw or finished water, or both?

MR. YARK: Gentlemen, these figures are related to raw water. These are parameters of pollution. Therefore, we felt that this might be of value for this conference.

MR. STEIN: Yes.

(The tables above referred to are as follows:)

August 1, 1965

Some Parameters of Pollution
Toledo, Ohio

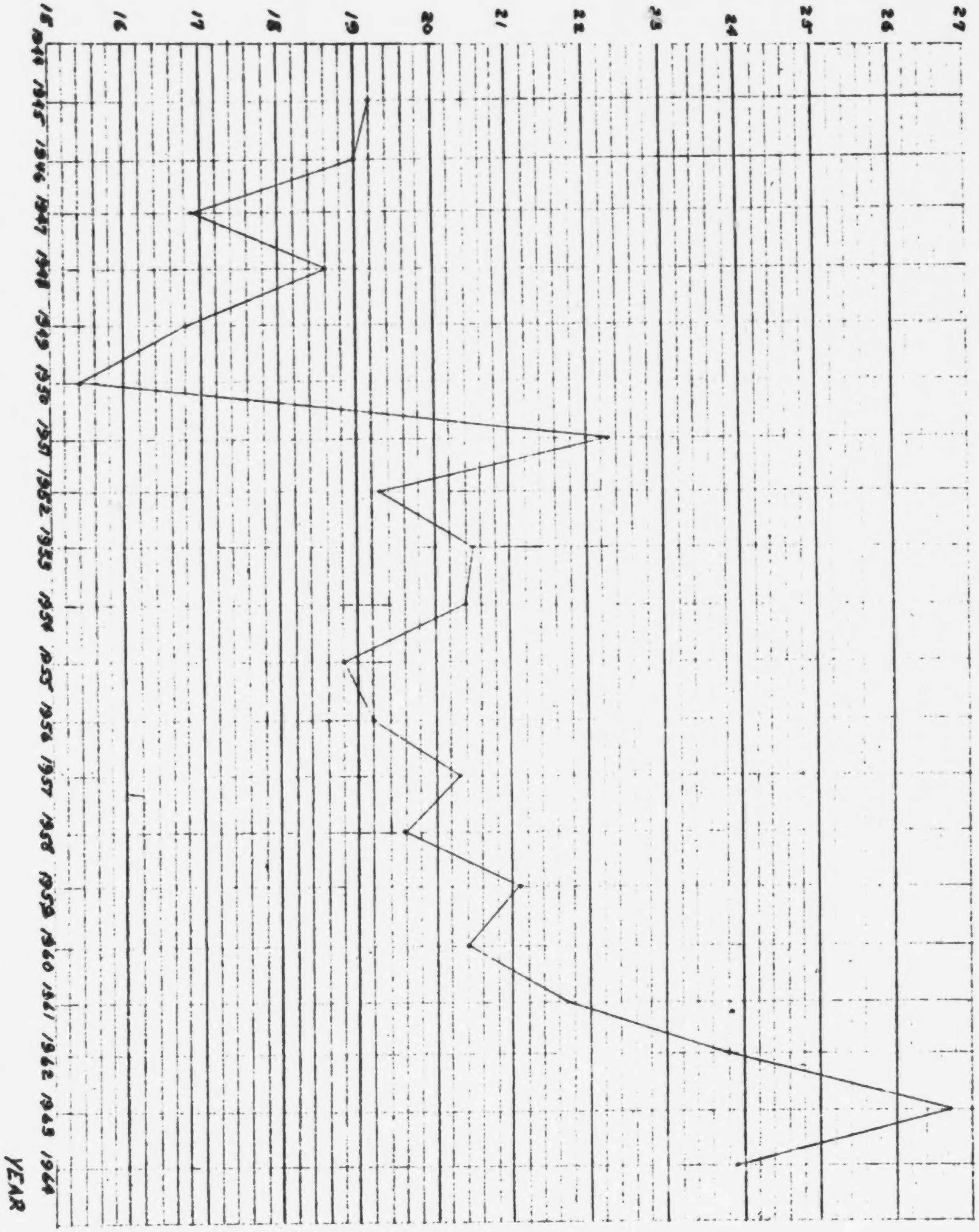
Year	Chlorides (Cl)	Coliforms per 100 ml	Raw Plate Count 37°C	Nitrates (N)	Cost of Chemicals/MG Treated	MPN per 100 ml Raw Water
1944	----	315	174	----	$ 3.35	—
1945	19.2	489	176	0.41	2.85	—
1946	19.0	347	83	0.23	2.34	—
1947	16.9	356	318	0.35	3.22	—
1948	18.6	787	477	1.30	3.89	—
1949	16.8	1,122	483	0.58	3.77	—
1950	15.4	1,947	936	0.77	5.18	—
1951	22.3	557	390	0.59	4.59	—
1952	19.3	3,786	578	0.50	4.63	—
1953	20.5	262	189	0.21	3.09	—
1954	20.4	227	178	0.44	4.65	—
1955	18.8	322	213	0.30	7.30	—
1956	19.2	179	377	0.40	10.19*	—
1957	20.3	218	435	0.46	11.93	—
1958	19.6	178	300	0.44	11.49	—
1959	21.1	318	659	0.78	13.75	—
1960	20.4	226	333	0.28	11.70	—
1961	21.7	253	234	0.46	11.50	—
1962	23.8	304	242	0.25	11.39	—
1963	26.7	229**	154	0.19	10.78	40***
1964	23.9	—	163	1.04	10.73	80

* Started Softening - Oct. 1956
** First 6-month average - changed to MPN on July 1, 1963
*** Last 6-month average - " " " " " " "

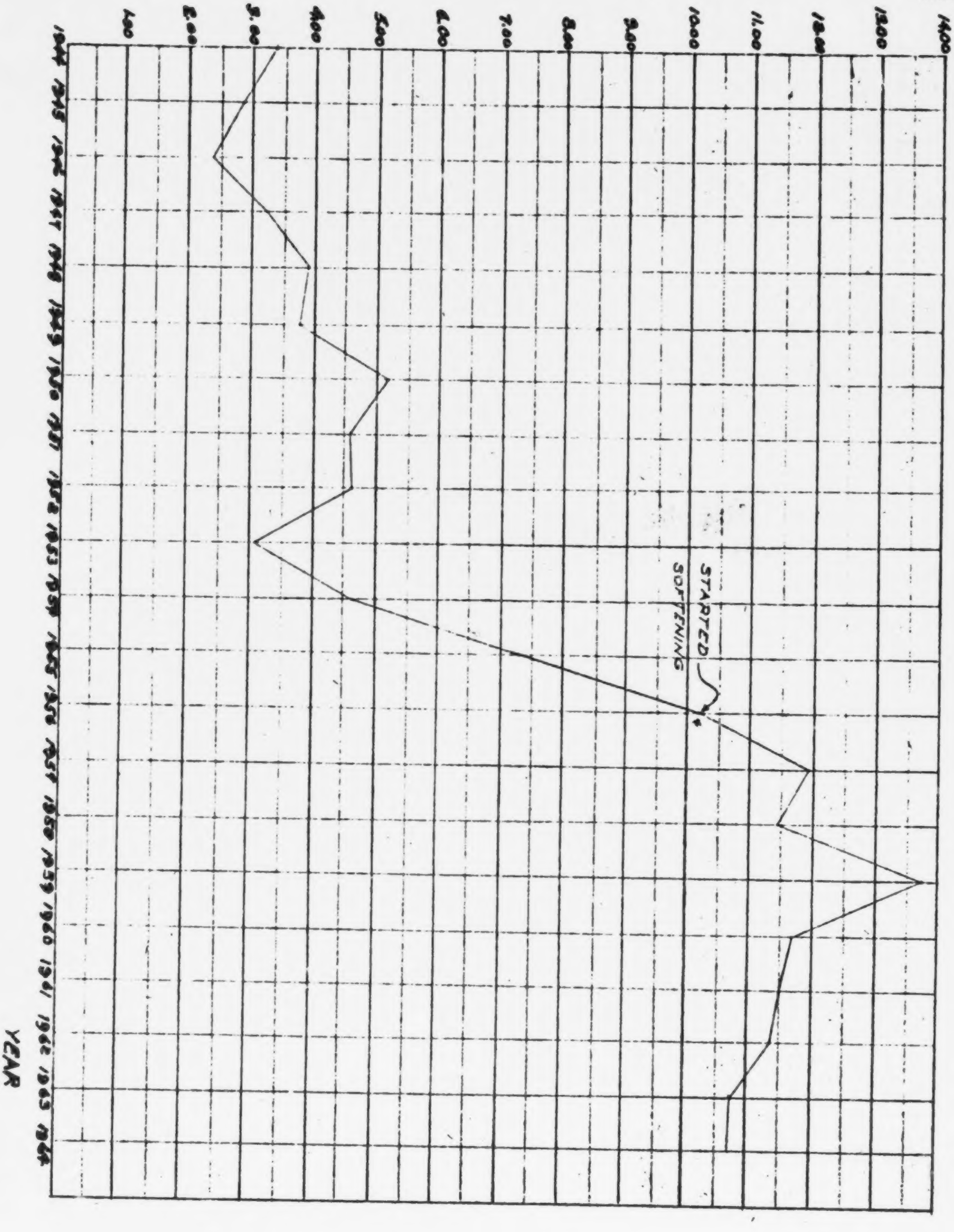
R. R. Henderson

R. R. Henderson
Superintendent of Water Treatment

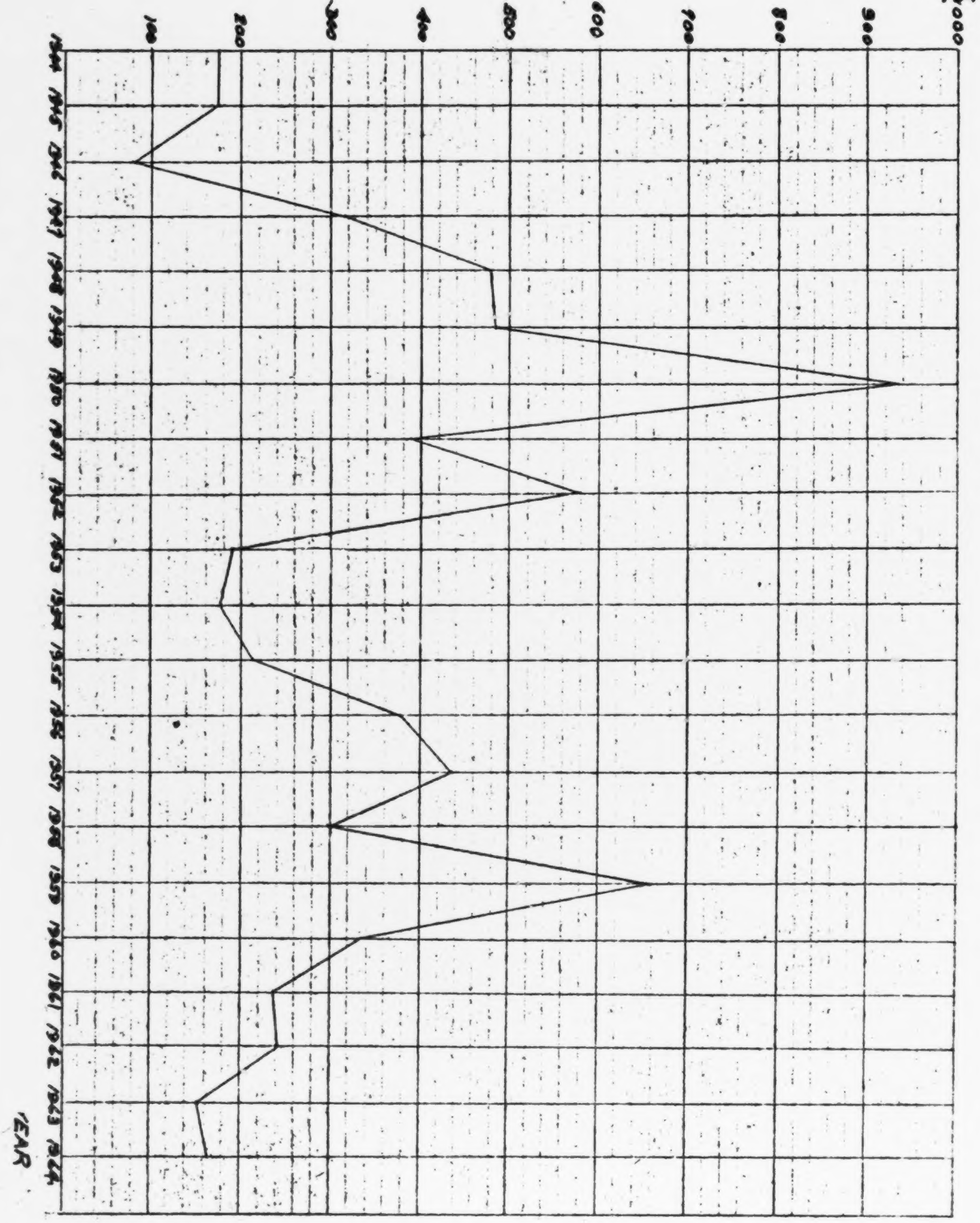
CHLORIDES (Cl)



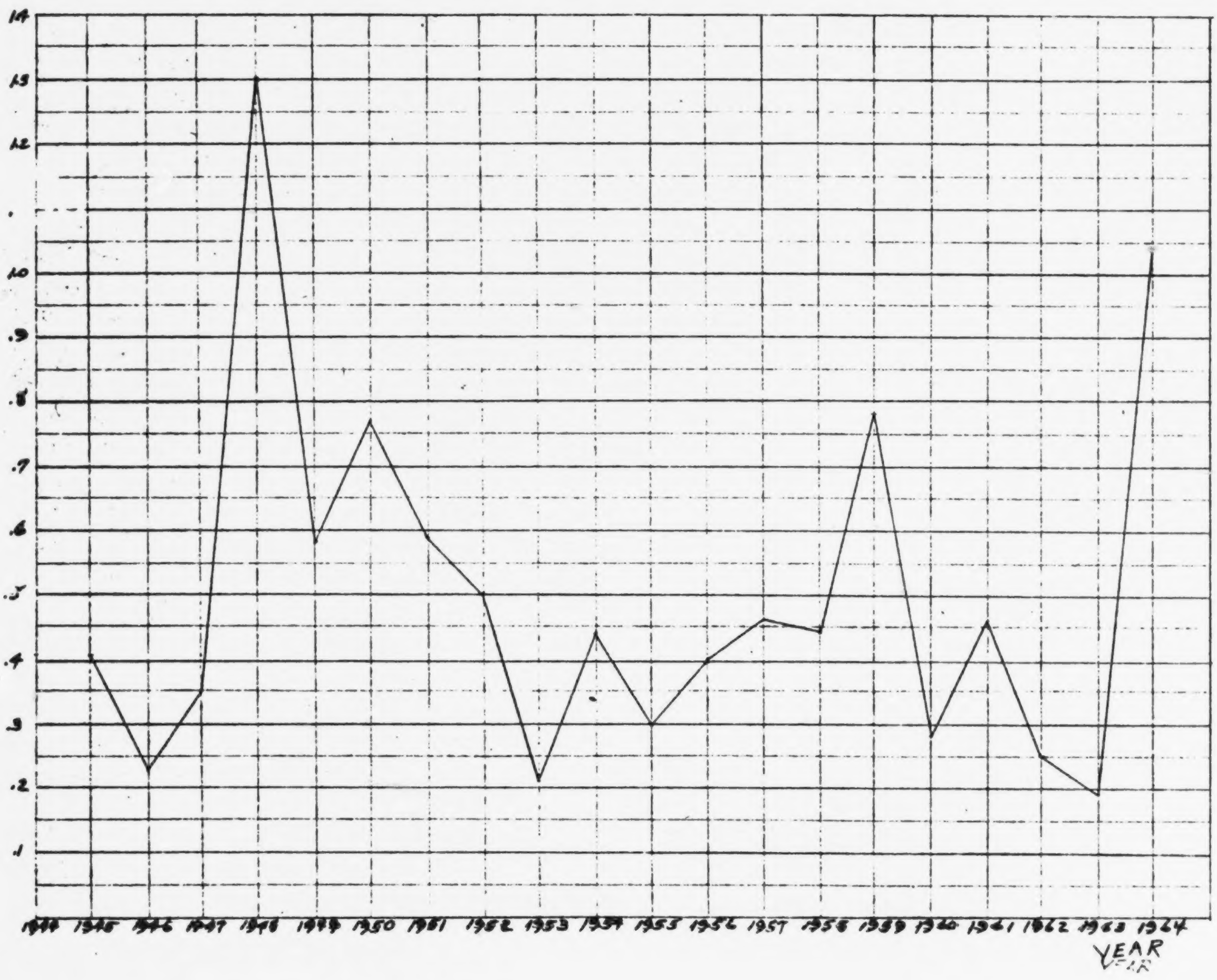
COST OF CHEMICALS / MG TREATED



RAW PLATE COUNT -37°C



NITRATES (N)


1.4
1.3
1.2
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.9
.8
.7
.6
.5
.4
.3
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.1
1944
1945
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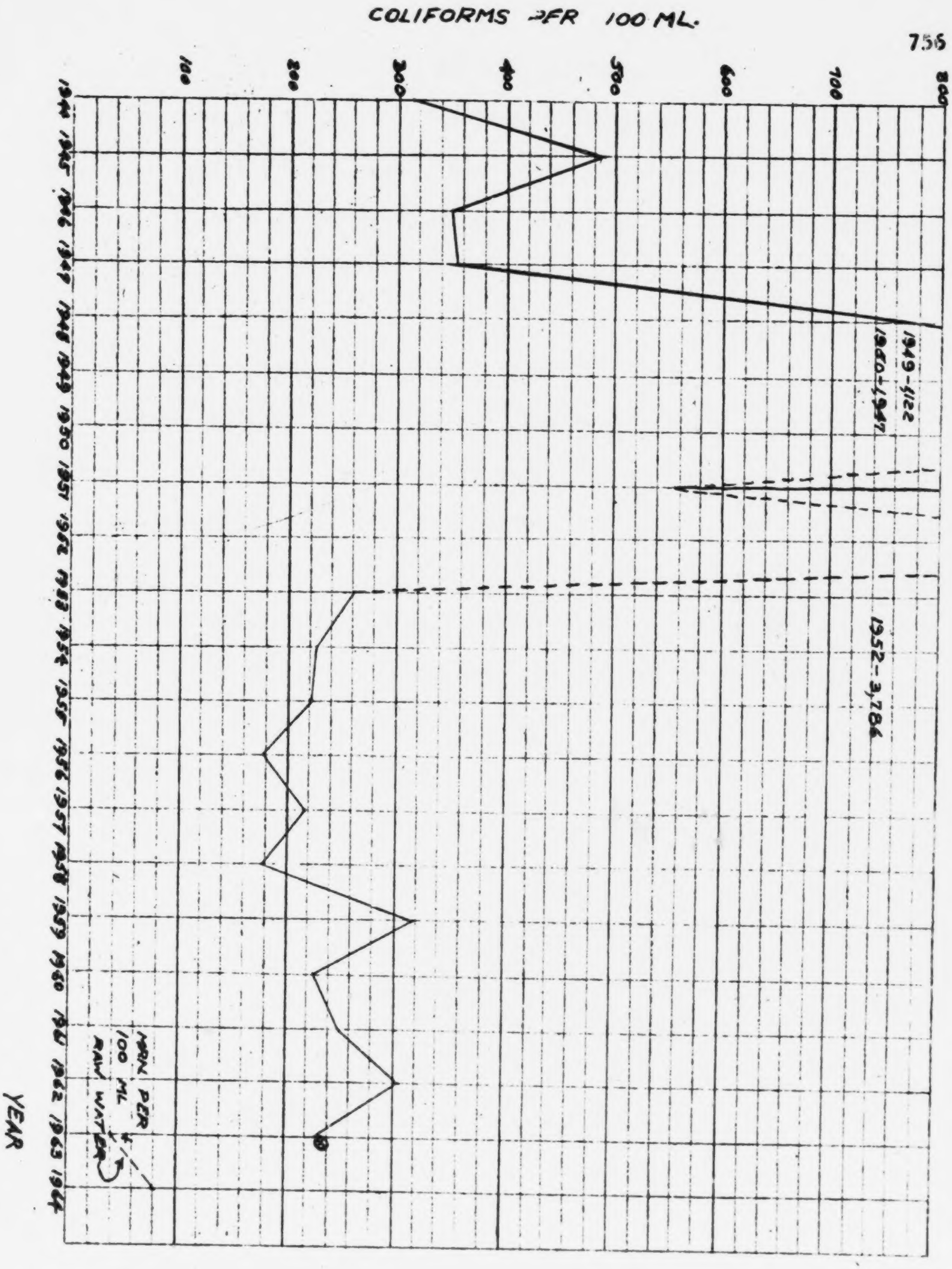
YEAR


COLIFORMS PER 100 ML.
100
200
300
400
500
600
700
800
1944
1945
1946
1947
1948
1949
1950
1951
1952
1953
1954
1955
1956
1957
1958
1959
1960
1961
1962
1963
1964
1949-5122
1950-1,947
1952-3,786
MPN PER 100 ML RAW WATER
YEAR

MR. YARK: Relative to water pollution in general, the celebrated American humorist, Will Rogers, is purported to have said, "Among the duties of politicians were those who point with pride and who view with alarm."

This statement might well be applied in water pollution control as the object, for there is much that has been done and much that should be done.

It is with pride that the City of Toledo calls attention to the fact that in 1959, its secondary treatment plant was placed in operation to supplement the primary treatment facilities, at a cost of over 9 million dollars.

Since that time, the city has embarked upon an ambitious annexation program, and is following with a sewer extension program, at the present only partially completed, but which will total in cost, by the end of the year, the sum of $7,456,000.

The majority of this expense has been borne by the service users of the community and its environs, with $725,490 of expected Federal assistance.

As a member of a family of communities, Toledo's collection and treatment facilities also provide service to the Cities of Maumee, Oregon and Rockford, as well as the Village of Ottawa Hills. Service contracts have been negotiated with the communities of Wallbridge, Ohio and Sylvania, Ohio, as well.

A painstaking reworking of the Planning Commission's subdivision regulation has been made. This will discourage the use of septic tanks in forthcoming residential developments.

A long standing policy of separation of storm and sanitary sewers in new construction is cited, as well as a provision for separation of existing combination sewers, at the earliest feasible date.

On May 1st, 1965, sewer maintenance and repair was transferred to the Department of Sewage Treatment. This provides for much closer control and inspection of sewage regulators and overflows.

The Division of Air and Water Pollution Control, which the City of Toledo has had in effect for approximately three and a half years, has been making a monthly check on streams and ditches as to pollution, and we are maintaining a record of that to determine whether or not pollution is on the increase or decrease.

As to the other side of the coin, rather than just a view with alarm, one might well urge some corrective measures. Therefore, a series of recommendations

Donald J. Yark

are offered, some of which are in common with the thinking of other communities.

It is recommended and suggested that continuing attention be given by the Federal Government to the problem of contaminating sewers, with a plan, a long range program of assistance, to the end purpose of eventual elimination of such systems;

That improved agricultural and soil conservation methods be promoted and encouraged. This should provide for the most careful and productive use of fertilizers, herbicides, insecticides, and fungicides, with the result that as little as possible of these materials will enter the watercourses of the country.

A related problem, also very serious, in the Maumee River is siltation with its deleterious effect upon marine life, as well as economic burden of maintenance of dredged channels so vital to the area.

That increased attention be given to the algae growth characteristics of treated sewage due to the presence of phosphates, which themselves are, to a large extent, due to detergents, and upon which the present approved methods of treatment have only partial effect.

That increased attention be given to the problem of underwater discharges from watercraft use, including sewage, garbage and debris.

That increased attention be given to the extent and effect of thermal pollution.

That a compact for pollution abatement be formed among the Lake Erie watershed states, possibly similar to others existing among various states throughout the country.

That less formal groups of a citizen-action nature be encouraged to be formed within the major riversheds contributing to Lake Erie.

Thank you.

(Applause.)

MR. STEIN: Thank you very much, Mr. Yark. Are there any comments or questions?

(No response.)

MR. STEIN: I have a question, or a comment. I don't know -- maybe it falls inbetween, but I do think we run through popular phases here --

MR. YARK: Sir?

MR. STEIN: We run through popular phases in water pollution control. A little while ago, we were on the detergent kick, and now I see one of the popular phases is the pesticide operation.

Now, as far as I can determine from at least our report, and I don't see this in the State report, we see no significant evidences yet of pesticides, or a pesticide problem here. There may be, if we checked, but we have no significant information on that yet.

MR. YARK: We do not have this problem in our sewage treatment plant at the present time either.

MR. STEIN: The point is, I do think, and people who have been involved with this know that, in order to get at a pesticide problem, while it is very, very popular now, we have to use very refined techniques, carbon filter techniques and then gas chromotography, looking for substances sometimes in parts per billion and in parts per trillion, and it is very successful.

I think again, in examining the problem here, that we shouldn't seek any special ones or look under the bed for ghosts, but if there is a pesticide problem, I am sure the State, and I am sure that Dr. Arnold as the health officer, will be the first to recognize that we have to go into that.

However, as far as all the reports indicate, I don't know that that is a significant problem here yet, and I hope it never will be.

MR. YARK: Well, this was merely a suggestion as to a possible future contaminant.

MR. POSTON: I would like to ask a question.

MR. STEIN: Yes, Mr. Poston.

MR. POSTON: I noted in your data concerning raw water quality, that you have a record of over quite a long period of time, and I wondered whether or not all of the samples that were analyzed were taken from the same intake?

MR. YARK: Yes. These were all taken from our same intakes.

MR. POSTON: Over this more than 20-year period?

MR. YARK: Yes, sir.

MR. POSTON: Then I noted your comments and suggestions relative to combined sewers, and I wondered, what is Toledo doing in this respect?

MR. YARK: We have embarked upon a very extensive sewer cleaning program, and also we are in the process of maintaining and repairing some of the sewage regulators that have failed, due to old age and so on, but we are actively engaged in this at the present time.

MR. POSTON: I was concerned more about the separation of sewers, so that you would have a storm sewer system and a sanitary sewer system, and whether or not new additions would be separated, or what is your policy?

MR. YARK: The policy of the City of Toledo has been, for thirty years, separate systems.

The older section of town is on the combined sewer system, and this poses a very large financial problem, to try to divert these.

We are hopeful that through part of our urban renewal, we might effect separation of these sewers in this area.

MR. STEIN: In your active annexation program you have separate systems, don't you, when you take them in?

MR. YARK: In most of our recently annexed areas, we have no sewers. We are in the process of constructing sanitary sewers and separate storm sewers.

MR. STEIN: But you are not constructing combined sewers?

MR. YARK: No. These will be separate sewers.

MR. STEIN: Mr. Oeming.

MR. OEMING: Mr. Yark, when did Toledo complete the plant, the sewage plant?

MR. YARK: The sewage plant?

MR. OEMING: Yes. What year was that?

MR. YARK: 1959, sir, the secondary treatment facilities.

MR. OEMING: 1959?

MR. YARK: Yes, sir.

MR. OEMING: Did you have treatment before that?

MR. YARK: Yes, sir, primary.

MR. OEMING: And when was that constructed?

MR. YARK: I'm afraid I will have to dig out my record book on that. It has been quite some time.

MR. OEMING: All right. Thank you.

MR. STEIN: Are there any further questions?

MR. OEMING: No, sir.

MR. STEIN: Are there any further questions or comments?

(No response.)

MR. STEIN: Thank you very much, Mr. Yark, for a very illuminating statement.

Dr. Arnold?

DR. ARNOLD: We would like to proceed, and allow the City of Akron to make their presentation.

Mr. Robert Fahey.

STATEMENT OF
ROBERT E. FAHEY,
DIRECTOR OF PUBLIC SERVICE,
CITY OF AKRON, OHIO

MR. FAHEY: My name is Robert E. Fahey, Director of Public Service of the City of Akron.

I have a prepared statement which I have changed, because of some statements that have been made.

It would be repetitious to recite the reasons for Akron's participation in this conference because the problems of water are well known to all of us who are present.

The main point is that immediate and concerted action must be taken by all responsible regulatory authorities and governmental agencies.

Above all, the contributors of waste waters must be forcefully impressed with the urgent demand for the protection of our water resources which are so badly needed for the health, welfare and economic well-being of the entire Lake Erie area, including its tributaries.

The City of Akron, recognizing these responsibilities, has taken action in its entire community of interest toward all aspects of water quality management.

For several years now, the City of Akron has been accepting and treating waste waters contributed by several communities in our metropolitan area.

Currently, Summit County is contemplating the construction of the large Mud Brook Waste Water Interceptor Sewer which will serve many communities to the north of Akron.

The City of Akron proposes to accept and treat these waste waters which should substantially reduce Cuyahoga River pollution.

To this end, our city will greatly expand our Water Pollution Control Station to not only accommodate this additional waste water, but also to meet the future needs of the City of Akron.

The City of Akron has recently expended over $300,000 for facilities to eliminate water treatment residues from the Cuyahoga River. We can now proudly state that the water now returned to the river is of better quality than that of the receiving stream.

In cooperation with our State Health Department, through Dr. Arnold and Chief Engineer Eagle and others, Messrs. Yark and the Chamber of Commerce, the industries and the newly created Citizens Advisory Committee on Water and Land Use, our industrial pollution control activities have been recently reestablished and broadened to include quality management of all waters received by the City of Akron and returned to the Cuyahoga River.

This newly created division will be responsible for monitoring and pollution control in the following activities:

1. Water Works Raw Water Reservoir pollution relating to brine and oil arising from improper drilling operations; sewage from industrial growth and new residential areas in this some 200-mile shore area of activity.
2. Industrial Pollution in the Akron Sewer System. This program has been authorized by City of Akron Ordinance No. 499-1963.
3. Combination Storm and Sanitary Sewers. In the third area of combined storm and sanitary sewers, we will have statistics which will provide us with information as to the degree of maintenance and inadequacy of our existing combined sewers,

particularly as they relate to bypass sewage and stream pollution, this as recommended by the State Board of Health.

4. Cuyahoga River pollution immediately above and below the Water Pollution Control Station at Botzum.
5. Water Pollution Control Station effluent to the Cuyahoga River as discharged.

It is estimated that the ultimate annual budget of this newly created division will be $100,000.

In furtherance of the above, the city contemplates a comprehensive 3-year research program to demonstrate the feasibility and economy of obtaining analytical data on water quality by the use of instruments and mobile laboratories.

Recreational activities, fishing, boating, hunting, and camping, are being expanded and governed in keeping with our program for maximum benefit to the public with full regard to water quality.

In conclusion, we will quickly meet our waste water quality objectives if we realize and discharge our responsibilities in this all important matter affecting our economic well-being and health and welfare as they relate to pure water.

Thank you.

(Applause.)

MR. STEIN: Thank you, sir.

Are there any comments or questions?

Mr. Poston.

MR. POSTON: I would just like to comment to the effect that I think municipal water utilities which provide water are an important water user requiring highest water quality, and I am very happy to see you, as a waterworks official, attending this and making known your desires for clean water for your source of supply.

I think it is only of recent vintage that the waterworks people have stood up to be counted in this matter.

Having been in the operation of waterworks myself in years past, the general procedure had been to provide another treatment so that you could handle the water of decreasing quality.

This to me is a very encouraging sign, that waterworks management is looking to a better water quality, and they are recognizing that this must be brought to the attention of others, if they are to get this.

MR. FAHEY: Thank you very much, but I am not a waterworks official.

(Laughter.)

The reason that we have been able to do as much as we have is because we have gotten much cooperation from the State authorities.

MR. STEIN: That is indeed a compliment to Mr. Poston. You see, you're so clean-cut, he feels you must be a waterworks official.

(Laughter.)

MR. POOLE: I am curious, as a matter for my own information, as to what kind of schedule the City of Akron maintains for the checking of its combined sewer overflows or its regulator changes.

Do you do that daily, weekly, twice a week, or what?

MR. FAHEY: It took us about six to nine months to have the council separate this program. They permitted us to proceed with this by including the job necessary for this pollution control or water quality control a few months ago.

We have had a few people involved in this area. This will permit us to expand this. We are just getting into this program. I could say that it is a few months old.

MR. POOLE: Thank you.

MR. STEIN: Are there any other questions or comments?

(No response.)

MR. STEIN: If not, thank you very much.

MR. FAHEY: Thank you.

MR. STEIN: Dr. Arnold?

DR. ARNOLD: Mr. Stein, I have here a report from the City Manager of Ashtabula, Ohio. I would like to have it presented into the record without reading it.

MR. STEIN: Without objection, this will be done.

(The statement of the Office of the City Manager of Ashtabula, Ohio, is as follows:)

CITY OF ASHTABULA
OFFICE OF THE CITY MANAGER
ASHTABULA, OHIO

August 3, 1965

CONFERENCE ON LAKE ERIE POLLUTION - CLEVELAND

Lake Erie pollution in the Ashtabula, Ohio area may be a typical example of the over-all pollution problem. We are deeply concerned about the problem, and we are not satisfied with the progress that has been made.

We have witnessed our local watercourses deteriorate. A stream fields brook used to be a source of game-fish and the location of the 'ole swimming hole', is now an industrial sewer. Odor conditions for the past ten years, have been so bad that residents within half a mile of the stream must frequently keep their doors and windows closed for extended periods.

The Ashtabula problems are not unique; they consist of sanitary wastes from unincorporated residential areas, and industrial wastes which eminate from outside the City - but which flow through a residential area of the City.

We have been aware of the water pollution problem for the past ten years - ten years of problems but no progress. We have had meetings and conferences with local, industrial officials, and with State and Federal Health Department representatives. Conditions of today are no better then they were ten years ago. By comparison, conditions are worse as a result of the report by the Ohio Department on Water Pollution Control in Lake Erie and its Tributaries in Ohio. This report, dated July 1965, indicates the industrial waste treatment by local industries is "currently acceptable" by the State. (but not acceptable by the people).

This current acceptance of present pollution reflects a serious problem to our local community. Ten years of efforts by local officials have been of some help but will be in vain unless drastic action is taken by the State and Federal Government.

Our concern is compounded by the report on pollution of Lake Erie by the U. S. Department of Health, Education and Welfare which is also dated July 1965. This Public Health Service Report makes positive recommendations for pollution abatement which should be followed with action.

We would like to offer the following for your consideration:

A. Establish direct contact between City and State, and between City and Federal authority for pollution abatement with a minimum of "red tape".

B. Initiate local seminars in each city on Lake Erie to inform all responsible officials both industrial and political, of area requirements.

C. Establish criteria for all discharges in the area which conforms with USPH.

D. Establish time table for action, with starting date of January 1, 1966.

E. State and/or City monitor each river and major tributary in are..

F. Publicize to the participants, the availability of Federal financing assistance, and strive for an accelerated tax write-off for industrial construction of pollution abatement facilities.

If just one problem can be solved at this meeting then I believe we have accomplished something; but until action is implemented then meetings are to no avail.

Thank you for your indulgence.

DAVID DE LUCA
CITY MANAGER.

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DR. ARNOLD: I also have a report from the City of Solon, which the officials there have requested that Mr. Eagle read and present it into the record.

MR. STEIN: I will be happy to have him do so.

Mr. Eagle.

MR. EAGLE: This letter is addressed to me from William E. Price, Mayor, City of Solon, in Cuyahoga County, which is a suburb of the City of Cleveland here.

He was here during the first part of the meeting and had to leave, and he asked me to read the following statement into the record.

(The statement of the City of Solon is as follows:)

CITY OF SOLON
6315 S.O.M. CENTER ROAD
CUYAHOGA COUNTY, OHIO 44139
248-1155

August 3, 1965

Mr. George H. Eagle
Chief Engineer
Ohio Department of Health
c/o Cleveland Sheraton Hotel
Ohio Pollution Conference
Cleveland, Ohio

Dear Mr. Eagle:

I attended the Lake Erie Pollution Conference this morning, and was unable to stay any longer. I had not been called on to make my statement, and would like the following statement to go on record:

"The City of Solon, with a population of 8,000 has completed a 2.0 million dollar sewage treatment works and collection system and anticipates the start of construction of a second system within ninety (90) days.

Project cost is estimated to be 2.1 million dollars. All 50 industries located in Solon have either pretreatment systems which drain into the municipal system or complete treatment which renders their wastes acceptable to state standards.

We feel that if a municipality the size of Solon can go forth with sewerage projects of the magnitude which they have, larger cities and industries with much greater financing capabilities can certainly go forward and rid themselves of the same problems."

Yours very truly,

WEP:ak

WILLIAM E. PRICE,
Mayor, City of Solon
Cuyahoga County
Solon, Ohio

MR. STEIN: As to that secondary treatment they have, I think you and I, years ago, were in the same business.

You know, this reminds me of the restaurant sanitation business. Once a man cleaned up his kitchen. He put a sign in his glass window and invited the public in, and he wanted every other restaurant to do likewise.

(Laughter.)

Dr. Arnold?

DR. ARNOLD: Mr. Stein, we are nearing the time that you asked that we adjourn. We will have three remaining municipalities to be heard from, one of which is Cleveland, which will be put on the agenda tomorrow, and we have Lorain and Cuyahoga Falls.

Do you wish to hear those now this afternoon? What is your pleasure?

MR. STEIN: Would it be too much trouble for them to wait, or do you want them to go on?

DR. ARNOLD: I don't know what their pleasure is.

MR. STEIN: I wonder if they could stay. I think our reporter has about reached the end of his rope, but if they cannot be here tomorrow we will take them.

Off the record.

(Discussion off the record.)

DR. ARNOLD: I think the City of Lorain

would like to be heard tonight.

MR. STEIN: All right.

DR. ARNOLD: This is Mr. A. V. Agnew, Superintendent of the Water & Sewer Department of the City of Lorain.

STATEMENT OF
A. V. AGNEW, SUPERINTENDENT,
WATER & SEWER DEPARTMENT
LORAIN, OHIO

MR. AGNEW: Mr. Chairman, Conferees, distinguished guests, and my peers:

As I have sat here for two days and listened to the talks, I have become more confused by the moment.

One thing that bothers me is this continual use of the word "pollution." Now, let us get one thing straight. All surface waters are polluted, and they will remain so. It is the degree of pollution with which we are concerned.

I'm so confused -- in fact, I feel like the farmer who was standing on a country road on a Sunday afternoon holding a rope, and his neighbor came up to him and said, "Jake, what are you doing, standing out here holding a rope?"

He said, "Dang new preacher! I'm so confused, I don't know whether I lost a horse or found a rope."

(Laughter.)

I have heard Lake Erie called a septic tank. I have heard it called grossly polluted. I have heard it said and read that it is not fit to be used as a public water supply, that it was the dirtiest fresh water lake in the world. Obviously, these people didn't hear of the Rhein River in Germany.

But this is what we have, ladies and gentlemen: We have a river.

I will now proceed with my official talk.

We in Lorain have been conducting a sanitary survey of Lake Erie for the past ten years. We have sixteen sampling points on the ten mile shore line of Lorain. The samples are taken by boat, by approved methods in approximately six feet of water during the months of June, July and August. There has been a constant and steady improvement of this water.

Average Per - 1960 - Thru 1964

	1960	1961	1962	1963	1964
Bact.Ct.	600	190	360	227	112
DO	8.40	7.11	7.60	7.80	8.9
BOD	2.20	1.68	2.80	2.40	3.2

The dissolved oxygen content of Lake intake water has been just about at the saturation point - winter and summer. The bacteria counts on the raw water intake for July 1964, for example, averaged below 100 per 100 ml.

The dry weather flow of storm sewers entering onto our beaches had a coliform count of less than 100 per 100 ml, which certainly did not indicate sanitary pollution. Samples were taken of gutter waters during heavy rainstorms - which waters discharged into the same storm sewers and onto the same beaches. We have gotten counts as high as 240,000 per 100 ml, and as low as 70,000 per 100 ml from these street gutter waters.

On a nice big rainfall last Sunday, I got samples right out of the gutter in front of my home. We have had inside plumbing on this street for 50 years. The average coliform count was 140,000 per 100 ml.

A. V. Agnew

To attribute the so called "Lake Pollution" to lack of sanitary sewage facilities and to industrial pollution, in my opinion, is an absolute false premise. As stated before, rainfall runoff from the fields and the city streets is, in my opinion, the principal contributor.

This was recently acknowledged in an article in The Plain Dealer by the United States Public Health Service Taft Research Center in Cincinnati, and a statement by an official was reported as saying, "Maybe we had better start thinking of treating the storm water?"

If you think we have spent money on foreign aid programs, that would be chicken feed compared to a storm water collection and treatment program. No city or state could possibly finance such a program.

Now, we have never denied that there may be pockets of pollution along the shores of Lake Erie and we do not know how polluted the Cuyahoga River is, because we have never checked it. We do know that such conditions should not reflect on the condition of the Lake as a whole.

Much to do is made by the news media that the United States Public Health Service Survey of 1963-1964 of Lake Erie found a 2,600 square mile area of bottom in the central basin of the Lake devoid of oxygen and that this in short was an indication of a "dying" lake.

For as long as I have been in Lorain, the U. S. Corps of Engineers have vacuum swept the bottom of Black River each year, and deposited this material, which was bound to have a high BOD, several miles out in the Lake, and I understand that they follow this routine every year on every navigable river flowing into the Lake, and this would of course include the Cuyahoga River.

In addition to this, in 1963, while the United States Public Health Service Survey was being made, the U. S. Corps of Engineers were directing the deepening of Black River by some several feet and also excavating a larger turning basin upstream. This work entailed the excavation of and disposal of millions of tons of river bottom and earth - containing a very high BOD - also several miles out into the Lake.

It is therefore no wonder that the United States Public Health Service have found the bottom conditions that they claim. The wonder is that they never saw or never took note - at least up to now they have never mentioned it as a possible contributing factor to

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their results - scows loaded with muck being towed out into the Lake and dumped.

They make much of the fact that Black River is "very polluted," but they did not bother to contact us to find out where the pollution was coming from.

During the late summer and fall of 1963, we were replacing the 1st Street - Oberlin Avenue trunk sanitary sewer that was in imminent danger of collapsing, and there were times when sanitary sewage had to be bypassed into storm sewers emptying into Black River.

In addition to these two local conditions was the severe drought in the summer of 1963, where stream flows, particularly in the upper reaches of the Black River and its tributaries were undiluted flows from septic tanks.

To deviate from my talk for a moment, some of the United States Public Health Service boys were comparing these results with the results of the State survey of Black River which was made in 1956, when we had one of the wettest summers we ever had, to the figures that they collected in 1963.

I maintain these factors must be considered when judgment is made of the condition of the streams and the Lake itself. It is pure folly to make such wild statements as have been made by the news media on the basis of one survey. Several such extensive surveys over a period of several years would have to be made before a pattern of behavior could be established.

David G. Frey, in his book, "Limnology of North America," Chapter 19 - the St. Lawrence and Great Lakes - states, "A major weakness in Great Lakes research is the lack of long term studies. Most of the past studies have the common fault of showing the conditions existing during a short time in a particular area."

Lake Erie water quality can also be shown by raw water analyses of the water treatment plant intakes along its shores. The analyses were performed by the Ohio Department of Health at each of the cities listed. Results were compiled for the past twenty years:

TABLE 1

CHEMICAL ANALYSES RAW WATER

CITY	TOTAL ALKALINITY PPM	TOTAL HARDNESS PPM	CHLORIDES PPM	SODIUM PPM
Toledo	100	137	16	10
Port Clinton	104	139	18	14
Sandusky	98	131	17	10
Huron	96	127	19	9
Elyria	98	121	18	9
Lorain	95	122	18	10
Avon Lake	94	127	18	10
Cleveland	98	126	19	10
Mentor	101	129	31	13
Painsville	96	144	40	16
Ashtabula	93	134	28	12
Conneaut	94	130	27	10
Av.	97	131	22	11
USPH				
Buffalo	89	129	22	10

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I think it may be safely said that we along the Lake wish to be treated the same as an inland city. In other words, if we can maintain high dissolved oxygen in the Lake with primary treatment, that should suffice - inland cities have a difficult time now with secondary treatment in maintaining a minimum of 4.0 PPM of dissolved oxygen in the summer season, when stream flows are low.

Nothin is all good or all bad. No doubt improvement can be made on the tributaries to Lake Erie - but as for the Lake waters they are, by comparison with other streams, very good indeed.

In conclusion I want it known also that there has been a steady improvement in the quality of the raw water at the water treatment plant - turbidities are low - algae low - bacteria low - dissolved oxygen high the year round, at the saturation point. This water is taken from 18 foot depth in 35 foot of water, approximately 3,000 feet from shore. The water is fairly soft, cool and easy to treat. Chemical costs averaged about $12.00 per million gallons in 1964 - which we do not consider excessive.

That about does it, gentlemen.

Thank you.

MR. STEIN: Are there any comments or questions?

(No response.)

MR. STEIN: Thank you very much for your presentation.

MR. AGNEW: I have a lot of comments to make about some of the other presentations. I didn't know you were allowed to speak from the floor.

MR. STEIN: You are not allowed to speak from the floor --

MR. AGNEW: Well, now that I have the rostrum --

(Laughter.)

MR. STEIN: I know now that you have the rostrum, but, you know, we are going to adjourn and come back tomorrow. Would you like to resume it then?

MR. AGNEW: No, thank you.

MR. STEIN: All right. Dr. Arnold?

DR. ARNOLD: We will continue tomorrow then, Mr. Stein.

MR. STEIN: We will meet tomorrow on this floor in the ballroom across the lobby at 9:30. We stand recessed.

(Whereupon, an adjournment was taken until Thursday, August 5, 1965, at 9:30 a.m.)